

**NATIONAL CARDIOVASCULAR DISEASE
DATABASE
(NCVD)**

**Annual Report of the
Percutaneous Coronary Intervention (PCI)
Registry
2013 – 2014**

Editors:

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Liew Hiong Bang

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- National Heart Association of Malaysia (NHAM)
- Health Informatics Centre, Ministry of Health Malaysia
- Clinical Research Centre (CRC), Ministry of Health Malaysia
- The members of various expert panels
- Our source data providers

PREFACE

The 2013 – 2014 PCI Registry is the fourth report since the inception of the Registry in 2007. This report provides information on not only the interventional cardiology practice in major cardiac centres in Malaysia but also the patients who underwent the interventional procedures. Such data is crucial as it represents facts rather than the usual estimates generated for the practicing healthcare professionals, private and public hospital administrators, policy makers, patients advocates, as well as the pharmaceutical and insurance industries. In addition to being an academic reference, the report can be used to improve quality of care, delivery of services, and healthcare planning.

A vast amount of data was collected, and this was only made possible with the countless hours the medical and nursing staff from individual sites throughout Malaysia spent uploading the information online. I thank them for their effort, commitment, perseverance, and enthusiasm for the last eight years; they have truly gone beyond the call of duty. Our sincere gratitude to the writing committee headed by Prof Dr Wan Azman Wan Ahmad, which devoted many weekends pouring through the data, analysing the figures, and transforming the data into meaningful information. I thank them for the effort and commitment, which truly showcased their passion for this project.

Our thanks also to the NCVD secretariat staffs in the Heart House, who quietly worked behind the scene, consistently following through and coordinating with the site investigators, the sub-investigators, the writing committee, the statisticians, etc. Without them, the registry and report would not have come together.

We strongly encourage everyone involved in the registry to fully utilise its immense data and to publish in medical journals so that the information can be shared worldwide; enabling Malaysia to truly contribute to the practice of cardiology globally.

Lastly, we would like to thank the National Heart Association of Malaysia, Clinical Research Centre of the Ministry of Health Malaysia, Health Informatics Centre of the Ministry of Health Malaysia, and the medical industries for the unrestricted grant to make this costly registry a reality.

Thank you

Datuk Dr Rosli Mohd Ali
Chairman
NCVD Governance Board

FOREWORD

Greetings and Salam!

Ten years ago, on 9th August 2006, we started this national multicentre NCVD PCI registry. Today, we are proud to see this registry grown and starting to bear fruits! This latest report accumulates our PCI experience involving 38,595 patients, 41,997 procedures and 54,202 coronary lesions since 2007 to 2014.

We hope the registry will provide a “real-world” database of contemporary PCI practice in Malaysia. We began this registry with the objectives to evaluate the outcomes of PCI based on selected performance measures, to determine the cost-effectiveness of PCI, to determine the level of adherence to practice guideline, to stimulate research, to facilitate quality improvement activities, to act as a reference for future studies, to facilitate research and development, and to benchmark against other national/regional PCI registries. e.g. ASPECT, ASEAN.

Much has been achieved, through the commitment and teamwork from everyone! However, there is more to do still. The way forward is to go beyond “output” to “outcome”, beyond “quantity” to “quality”. With the sizeable number of cases reported, we may now embark on more analysis of trends and subgroups, to determine the factors that contribute to procedural success and long-term patient-centred outcomes. To this end, we may embark to appraise our practice based on both clinical practice guidelines (CPG) and appropriateness use criteria (AUC).

Beyond the value to service improvement, our registry may provide the platform for ‘registry-based randomised controlled trials’, post-marketing surveillance as required by the recent governance of medical devices in the ever-changing field of interventional cardiology.

The way forward for the next decade and beyond will depend on continual commitment and support in leadership and funding from NHAM. The machinery of the NCVD registry lies with each of us. The NCVD-PCI registry will continue to be a voluntary collaborative group, with shared ownership. Participating sites will continue to have free access to their ‘own’ institutional database to facilitate local quality-assurance activities. We continue to uphold the ‘code of honour’, *Together everyone achieves more.*

We would also like to take this opportunity to thank Dr Rosli Mohd Ali, for his leadership, dedication and perseverance.

Happy Reading. We welcome feedback and comments.

Dr Liew Hong Bang

Chairman

NCVD-Percutaneous Coronary Intervention (PCI) Registry

NOTE FROM THE WRITING COMMITTEE CHAIRMAN

The NCVD is an initiative by Prof Dr Sim Kui Hian established under the Ministry of Health Malaysia. Its aim is to collect information about cardiovascular disease (CVD) in Malaysia which will enable us to estimate disease incidence, and evaluate risk factors and treatment. These data and information will be useful in planning and evaluating strategies for CVD prevention and control.

The NCVD Governance Board was established in year 2006. Its role is to oversee the operations of the NCVD to ensure that the NCVD stays focused on its objectives, and its continuing relevance and justification.

Currently we have successfully set up two registries; the NCVD-Acute Coronary Syndrome (ACS) registry and the NCVD Percutaneous Coronary Intervention (PCI) registry. Each registry has its own steering committee which comprises individuals who were subject matter experts, representatives from Ministry of Health, Universities, National Heart Institute, and Private Hospital. The committee establishes policy and procedures for the running of the registry, encourages the continuous participation of source data providers (SDP), disseminates information about the registry, communicates results at local and international levels, approves and validates statistical analysis, and ensures the quality control of the reported data.

We also have the medical writing committee, which has the crucial roles of preparing the registry's regular or interim report and subsequently the manuscript for journal submission. So far, we have completed four reports for the NCVD-ACS and three reports for NCVD PCI registries:

1. Annual Report of the NCVD-ACS Registry 2006
2. Annual Report of the NCVD-ACS Registry 2007 and 2008
3. Annual Report of the NCVD-ACS Registry 2009 and 2010
4. Annual Report of the NCVD-ACS Registry 2011 and 2013
5. Annual Report of the NCVD-PCI Registry 2007
6. Annual Report of the NCVD-PCI Registry 2007 – 2009
7. Annual Report of the NCVD-PCI Registry 2010 – 2012

These reports are available at NHAM websites. We also have 13 other publications:

1. The foundation of NCVD PCI Registry: The Malaysia's first multi-centre interventional cardiology project (Medical Journal of Malaysia 2008)
2. Acute Coronary Syndrome (ACS) registry - Leading the charge for National Cardiovascular Disease (NCVD) database (Medical Journal of Malaysia 2008)
3. Highlight of the first Malaysian NCVD-PCI registry (CVD Prevention and Control Journal 2011)
4. Malaysian NCVD registry: How are we different? (CVD Prevention and Control Journal 2011)
5. Acute coronary syndrome in women of reproductive age. (International Journal of Women's Health 2011)
6. The journey of Malaysian NCVD-PCI registry: A summary of three years report (International Journal of Cardiology 2013)

7. An Asian validation of the TIMI risk score for ST-segment elevation myocardial infarction: Results and implications for cardiac care in a developing country (PLOS ONE 2012)
8. Impact of cardiac care variation on ST-elevation myocardial infarction outcomes in Malaysia (The American Journal of Cardiology 2013)
9. Are there gender differences in coronary artery disease? The Malaysian National Cardiovascular Disease Database – Percutaneous Coronary Intervention (NCVD-PCI) registry (PLOS One 2013)
10. Young coronary artery disease in patients undergoing percutaneous coronary intervention (Annals of Saudi Medicine 2013)
11. The Asia-Pacific evaluation of cardiovascular therapies (ASPECT) - Improving the quality of cardiovascular care in the Asia Pacific region (International Journal of Cardiology 2014)
12. Gender differences in acute coronary syndrome in a multiethnic Asian population: Results of the Malaysian National Cardiovascular Disease Database-Acute Coronary Syndrome (NCVD-ACS) registry. (Global Heart Journal 2014)
13. The elderly in acute coronary syndrome: The Malaysian National Cardiovascular Database - Acute Coronary Syndrome (NCVD-ACS) registry (Singapore Medical Journal 2016)

Many abstracts had been presented locally in the form of posters and oral presentations. Many of the data had also been presented international conferences. At the moment, we are working on several more papers for publication. We are also hoping to collaborate with other international registries.

I would like to welcome the newly appointed Writing Committee Members into our team and I am definitely looking forward to working hard and fruitfully together. Finally, we would like to thank all involved for their tireless effort and unwavering determination as well as for sacrificing their invaluable time to provide these data. Despite all of the challenges and shortcomings, we can at least be proud to have our own database which provides a yardstick on how we have performed and give us guidance for further improvement. We hope more hospitals particularly the private institutions will come forward and participate in this registry. We also encourage all young cardiologists to be actively involved in this registry. This project is, without a doubt, an asset towards realising the long-term national goal to create new, impeccable medical histories through cardiology.

Yours sincerely

Prof Dr Wan Azman Wan Ahmad
Chairman
NCVD Writing Committee

ABBREVIATIONS

ACE	Angiotensin Converting Enzyme
ACS	Acute Coronary Syndrome
BMI	Body Mass Index
CABG	Coronary Artery Bypass Graft
CAD	Coronary Artery Disease
CCU	Coronary Care Unit
CK	Creatinine Kinase
CK-MB	Creatinine Kinase, MB Isoenzyme
CRC	Clinical Research Centre
CRF	Case Report Form
CVD	Cardiovascular Disease
DBMS	Database Management System
EDC	Electronic Data Capture
GFR	Glomerular filtration rate
GP	Glycoprotein
HDL	High Density Lipoprotein
HDU	High Dependency Unit
HIC	Health Informatics Centre
ICT	Information and Communication Technology
ICU	Intensive Care Unit
IJN	Institut Jantung Negara
IT/IS	Information Technology and Information System
JPN	Jabatan Pendaftaran Negara
LDL	Low Density Lipoprotein
LVEF	Left Ventricular Ejection Fraction
MDRD	Modification of Diet in Renal Disease
MOH	Ministry of Health
NCVD	National Cardiovascular Disease Database
NHAM	National Heart Association of Malaysia
NSTEMI	Non-ST-Elevation Myocardial Infarction
PMP	Per Million Population
RCC	Registry Coordinating Centre
SAP	Statistical Analysis Plan
SD	Standard Deviation
SDP	Source Data Provider
STEMI	ST-Elevation Myocardial Infarction
TIMI	Thrombolysis In Myocardial Infarction
TnI	Troponin I
TnT	Troponin T
UA	Unstable Angina

NCVD-PERCUTANEOUS CORONARY INTERVENTION (PCI) REGISTRY

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PATIENT CHARACTERISTICS

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Summary

1. Patient characteristics remained similar between the periods of 2007 – 2012 and 2013 – 2014.
2. Nearly all patients had at least one known cardiovascular risk factor (97.2%); however, compared to 2007 – 2012, the trend was lower: dyslipidemia (71.9% vs. 59.4%), hypertension (73.0% vs. 66.8%), and diabetes (45.7% vs. 43.3%). Compared with the SCAAR registry (17.5%), the prevalence of diabetes mellitus was much higher.
3. To improve outcomes of PCI, patients' risk factors should be optimally treated post procedure.
4. Malaysian patients were younger with a mean age of 57.7 (SD 10.4) years, which is 10 years younger than patients in the SCAAR registry, 67.1 (SD 11.2) years.
5. Twenty-two percent (22.2%) of patients were below the age of 50 years. More Malay and Indian patients, compared to Chinese patients were under the age of 50 years.

Data from 14,136 patients obtained from 15 centres was analysed. The main source data providers were Institut Jantung Negara, Pusat Jantung Hospital Umum Sarawak, Hospital Queen Elizabeth II, Hospital Sultanah Bahiyah, Hospital Pulau Pinang, Pusat Perubatan Universiti Malaya and Hospital Sultanah Aminah. [Table 1.3.1]

The data on patient characteristics will be reported in two periods: between the years 2007 – 2012 and 2013 – 2014. This was because the main finding from 2007 – 2012 had been published, and the subsequent data from 2013 – 2014 would be compared to the former.

In total, of the 14,136 patients, 91.1 % had a single PCI procedure while the remaining had two or more. [Table 1.2]

The mean ages of patients were 57.4 (SD 10.3) years for 2007 – 2012, and 57.7 (SD 10.4) years for 2013 – 2014. The largest group of patients in 2007 – 2012 and 2013 – 2014 were aged between 50 (35.8%) and 60 years old (36.6%), respectively. Patients below the age of 50 years comprised 23.4% in 2007 – 2012 vs. 22.2% in 2013 – 2014. [Table 1.1]

Relatively more males than females underwent PCI; 82.0% in 2007 – 2012 and 83.6% in 2013 – 2014. [Table 1.1]

The distributions of patients from the major ethnic groups in 2007 – 2012 were similar for Malays (48.4% vs. 49.7%), Chinese (23.1% vs. 21.9%), and Indians (21.7% vs. 19.4%). The next major ethnic group was Iban. [Table 1.1]

Cardiovascular risk factors

In total, 98.1% of patients in 2007 – 2012 and 97.2 % in 2013 – 2014 had at least one cardiovascular risk factor. [Table 1.5.1]

In terms of active smokers, there was a 6% increase; 21.1% in 2007 – 2012 vs. 27.8% in 2013 – 2014. Seventeen percent of patients had a family history of premature cardiovascular disease in 2007 – 2012 and 10.6% in 2013 – 2014. The mean body index was similar in 2007 – 2012 and 2013 – 2014, with 26.6 kgm⁻² (SD 4.3) and 26.6 kgm⁻² (SD 4.4), respectively. [Table 1.1]

There was a decreased trend for dyslipidaemia (71.8% in 2007 – 2012 vs. 59.4% in 2013 – 2014), hypertension (73.0% in 2007 – 2012 vs. 66.8% in 2013 – 2014), and diabetes (45.7% in 2007 – 2012 vs. 43.3 % in 2013 – 2014). Forty-four percent had a previous history of myocardial infarction in 2007 – 2012 and 38.2% in 2013 – 2014. Fifty-five percent had a previous history of known coronary artery disease in 2007 – 2012 and 40.2% in 2013 – 2014. [Table 1.1]

There was an increased trend for PCI among patients with new onset angina (23.7% in 2007 – 2012 vs. 28.6% in 2013 – 2014) and chronic cardiac failure (CCF) (3.6% in 2007 – 2012 vs. 4.2% in 2012 – 2014). [Table 1.1]

There were 5.8% patients with chronic renal failure (CRF) in 2007 – 2012 and 4.8% in 2012 – 2014. There were 20.3% patients with a previous history of percutaneous coronary intervention (PCI) in 2007 – 2012 and 16.2% in 2012 – 2014. [Table 1.1]

Finally, there were 4.0% patients with a previous history of CABG in 2007 – 2012 and 3.2% in 2012 – 2014. [Table 1.1]

Age, gender and ethnicity, in 2007 – 2012

Males under the age of 50 years: Malays (27.9%), followed by Indians (25.6%), and Chinese (19.7%). Females under the age of 50 years: Malays (14.0%), followed by Indians (13.5%), and Chinese (5.5%). [Table 1.4.2]

Age, gender and ethnicity, in 2013 – 2014

Males under the age of 50 years: Malays (25.6%), followed by Indians (23.7%), and Chinese (19.0%). Females under the age of 50 years: Malays (12.4%), followed by Indians (12.7%), and Chinese (5.0%). Chinese male and female patients tend to have PCI at an older age. [Table 1.4.2]

Comparative analysis with published data from the region on cardiovascular risk factors

These findings were compared with the Swedish Coronary Angiography and Angioplasty Registry (SCAAR) which recruited 25,143 patients from 2009 to 2010. It is apparent that the mean age of patients proceeding with angioplasty was much higher at 67.1 years. Around 51.4% had hypertension, and the prevalence of dyslipidaemia was almost similar to our own population at 39.8%. Interestingly, the prevalence of diabetes mellitus is comparatively much lower at 17.5%, and about a fifth of patients were smokers.²

Based on the Mayo Clinic Percutaneous Coronary Intervention Registry which recruited 7251 patients from 2002 to 2010, the prevalence of diabetes mellitus was 29.0%, hypertension was 21.0% and dyslipidaemia was 85.0%. The mean age of patients was 67.2 years old.³

Based on the comparisons with these other registries, it can be deduced that our patients requiring angioplasty were younger by ten years and also had a markedly higher prevalence of diabetes mellitus. In light of this, it is important that the management of cardiovascular risk factors be carried out more effectively with special emphasis on diabetes mellitus.

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Table 1.1 Characteristics of patients who underwent PCI, NCVD-PCI Registry, 2007 – 2014

Year	2007 – 2012		2013		2014		2013 – 2014	
Total no. of patients	24459		6353		7783		14136	
	No.	%	No.	%	No.	%	No.	%
Demographics								
Age, Years								
N	24459		6353		7783		14136	
Mean (SD)	57.4 (10.3)		57.6 (10.4)		57.8 (10.5)		57.7 (10.4)	
Median (min, max)	57.3 (21.1, 97.7)		57.6 (23.6, 91.5)		57.9 (20.1, 96.0)		57.8 (20.1, 96.0)	
Age group, No. (%)								
20 – < 30	89	0.4	29	0.4	33	0.4	62	0.4
30 – < 40	955	4.0	290	4.6	379	4.8	669	4.8
40 – < 50	4658	19.0	1111	17.4	1289	16.6	2400	17.0
50 – < 60	8774	35.8	2355	37.0	2816	36.2	5171	36.6
60 – < 70	6995	28.6	1767	27.8	2269	29.2	4036	28.6
70 – < 80	2757	11.2	731	11.6	892	11.4	1623	11.4
≥ 80	231	1.0	70	1.2	105	1.4	175	1.2
Gender, No. (%)								
Male	20073	82.0	5290	83.2	6528	83.8	11818	83.6
Female	4386	18.0	1063	16.8	1255	16.2	2318	16.4
Ethnic group, No. (%)								
Malay	11841	48.4	3122	49.3	3896	50.0	7018	49.7
Chinese	5650	23.1	1413	22.3	1663	21.4	3076	21.9
Indian	5298	21.7	1187	18.6	1547	19.8	2734	19.4
Orang asli	2	0.0	5	0.0	4	0.0	9	0.0
Kadazan Dusun	191	0.8	116	1.8	103	1.4	219	1.6
Melanau	16	0.0	5	0.0	9	0.2	14	0.0
Murut	8	0.0	6	0.0	6	0.0	12	0.0
Bajau	102	0.4	61	1.0	74	1.0	135	1.0
Bidayuh	108	0.4	49	0.8	15	0.2	64	0.4
Iban	641	2.7	171	2.6	187	2.4	358	2.6
Punjabi	214	0.8	34	0.6	45	0.6	79	0.6
Other Malaysian	228	1.0	121	2.0	168	2.2	289	2.0
Foreigner	135	0.7	58	1.0	63	0.8	121	0.8
Not available	22	0.0	5	0.0	3	0.0	8	0.0
Missing	3	0.0	0	0	0	0	0	0

Year	2007 – 2012		2013		2014		2013 – 2014	
Total no. of patients	24459		6353		7783		14136	
	No.	%	No.	%	No.	%	No.	%
Other coronary risk factors								
Smoking, No. (%)								
Never	8883	36.3	2035	32.0	2789	35.8	4824	34.2
Former (quit > 30 days)	6844	28.0	1335	21.0	1744	22.4	3079	21.8
Current (any tobacco use within last 30 days)	5177	21.1	1842	29.0	2100	27.0	3942	27.8
Not available	3519	14.4	1141	18.0	1150	14.8	2291	16.2
Missing	36	0.2	0	0	0	0	0	0
Family history of premature cardiovascular disease, No. (%)								
Yes	4151	17.0	710	11.2	784	10.0	1494	10.6
No	17416	71.2	4349	68.4	5427	69.8	9776	69.2
Not known	2858	11.6	1294	20.4	1572	20.2	2866	20.2
Missing	34	0.2	0	0	0	0	0	0
Body mass index (BMI), kgm ⁻²								
N	19606		4639		6019		10658	
Mean (SD)	26.6 (4.3)		26.6 (4.4)		26.6 (4.4)		26.6 (4.4)	
Median (min, max)	26.1 (14.0, 49.9)		26.2 (14.0, 49.7)		26.1 (14.0, 49.8)		26.1 (14.0, 49.8)	
Missing, No. (%)	4853	19.8	1714	27.0	1764	22.6	3478	24.6
BMI, kg/m ² , No. (%)								
< 18.5	289	1.2	69	1.0	88	1.2	157	1.2
18.5 – 23	3470	14.2	822	13.0	1087	13.9	1909	13.5
> 23 – < 25	3726	15.2	902	14.2	1177	15.1	2079	14.7
25 – < 30	8327	34.0	1946	30.6	2514	32.4	4460	31.5
30 – < 35	3000	12.3	695	11.0	894	11.4	1589	11.1
35 – < 40	629	2.6	157	2.4	201	2.6	358	2.6
≥ 40	165	0.7	48	0.8	58	0.8	106	0.8
Missing	4853	19.8	1714	27.0	1764	22.6	3478	24.6
Co-morbidities								
Dyslipidaemia, No. (%)								
Yes	17582	71.8	3811	60.0	4579	58.8	8390	59.4
No	5678	23.2	1950	30.6	2472	31.8	4422	31.2
Not known	1162	4.8	592	9.4	732	9.4	1324	9.4
Missing	37	0.2	0	0	0	0	0	0

Year	2007 – 2012		2013		2014		2013 – 2014	
Total no. of patients	24459		6353		7783		14136	
	No.	%	No.	%	No.	%	No.	%
Hypertension, No. (%)								
Yes	17878	73.0	4275	67.3	5162	66.4	9437	66.8
No	6046	24.8	1745	27.5	2155	27.6	3900	27.6
Not known	517	2.2	333	5.2	466	6.0	799	5.6
Missing	18	0.0	0	0	0	0	0	0
Diabetes, No. (%)								
Yes	11165	45.7	2734	43.0	3394	43.7	6128	43.3
No	12645	51.6	3222	50.8	3837	49.3	7059	49.9
Not known	628	2.7	397	6.2	552	7.0	949	6.8
Missing	21	0.0	0	0	0	0	0	0
Type of diabetes treatment, No. (%)								
OHA	8395	34.4	1785	28.0	1997	25.6	3782	26.8
Insulin	1219	5.0	390	6.2	583	7.4	973	6.8
OHA + insulin	579	2.4	279	4.4	354	4.6	633	4.4
Non-pharmacology therapy	312	1.2	168	2.6	214	2.8	382	2.8
Myocardial infarction history, No. (%)								
Yes	10749	44.0	2557	40.2	2845	36.6	5402	38.2
No	12814	52.3	3330	52.4	4271	54.8	7601	53.8
Not known	867	3.5	466	7.4	667	8.6	1133	8.0
Missing	29	0.2	0	0	0	0	0	0
Documented coronary artery disease, No. (%)								
Yes	13464	55.0	2702	42.6	2976	38.2	5678	40.2
No	10487	42.8	3309	52.0	4324	55.6	7633	54.0
Not known	481	2.0	342	5.4	483	6.2	825	5.8
Missing	27	0.2	0	0	0	0	0	0
New onset angina (< 2 weeks), No. (%)								
Yes	5780	23.7	1881	29.6	2169	27.8	4050	28.6
No	18168	74.3	4144	65.2	5130	66.0	9274	65.6
Not known	487	2.0	328	5.2	484	6.2	812	5.8
Missing	24	0.0	0	0	0	0	0	0
Congestive heart failure (2 weeks prior), No. (%)								
Yes	898	3.6	228	3.6	359	4.6	587	4.2
No	23049	94.2	5890	92.8	7002	90.0	12892	91.2
Not known	481	2.0	235	3.6	422	5.4	657	4.6
Missing	31	0.2	0	0	0	0	0	0

Year	2007 – 2012		2013		2014		2013 – 2014	
Total no. of patients	24459		6353		7783		14136	
	No.	%	No.	%	No.	%	No.	%
Cerebrovascular disease, No. (%)								
Yes	352	1.5	152	2.4	247	3.2	399	2.8
No	23675	96.8	5949	93.6	7117	91.4	13066	92.4
Not known	410	1.7	252	4.0	419	5.4	671	4.8
Missing	22	0.0	0	0	0	0	0	0
Peripheral vascular disease, No. (%)								
Yes	205	0.8	59	1.0	60	0.8	119	0.8
No	23822	97.4	6036	95.0	7294	93.7	13330	94.3
Not known	407	1.6	258	4.0	429	5.5	687	4.9
Missing	25	0.2	0	0	0	0	0	0
Chronic renal failure (> 200 micromol), No. (%)								
Yes	1441	5.8	320	5.1	357	4.6	677	4.8
No	22589	92.4	5786	91.1	7025	90.2	12811	90.6
Not known	401	1.6	247	3.8	401	5.2	648	4.6
Missing	28	0.2	0	0	0	0	0	0
*Coronary artery disease, No. (%)								
Yes	19590	80.1	4765	75.1	5445	70.0	10210	72.2
No	4365	17.8	1264	19.9	1813	23.2	3077	21.8
Not known	504	2.1	324	5.0	525	6.8	849	6.0
Baseline investigation								
Baseline creatinine, mmol/L								
N	22221		5370		6647		12017	
Mean (SD)	116.9 (121.7)		116.0 (117.2)		116.1 (117.5)		116.0 (117.4)	
Median (min, max)	93.0 (44.0, 6500.0)		92.0 (44.0, 1510.0)		91.0 (44.0, 1632.0)		92.0 (44.0, 1632.0)	
Not available, No. (%)	903	3.7	398	6.2	638	8.2	1036	7.4
Missing, No. (%)	1335	5.4	585	9.2	498	6.4	1083	7.6
Baseline creatinine, mmol/L, No. (%)								
< 100	13407	54.8	3275	51.6	4133	53.2	7408	52.4
100 – 199	7669	31.4	1811	28.6	2168	27.8	3979	28.2
≥ 200	1145	4.7	284	4.4	346	4.4	630	4.4
Not available	903	3.7	398	6.2	638	8.2	1036	7.4
Missing	1335	5.4	585	9.2	498	6.4	1083	7.6

Year	2007 – 2012		2013		2014		2013 – 2014	
Total no. of patients	24,459		6,353		7,783		14,136	
	No.	%	No.	%	No.	%	No.	%
**Glomerular filtration rate (GFR), MDRD								
N	22206		5370		6647		12017	
Mean (SD)	74.0 (25.2)		75.4 (25.9)		75.6 (25.9)		75.5 (25.9)	
Median (min, max)	75.0 (0.6, 212.5)		75.6 (2.9, 179.2)		76.7 (2.7, 200.5)		76.0 (2.7, 200.5)	
Missing, No. (%)	2253	9.2	983	15.5	1136	14.6	2119	15.0
**Glomerular filtration rate (GFR), MDRD, No. (%)								
< 15	710	2.9	166	2.6	217	2.8	383	2.7
15 – < 30	488	2.1	120	1.8	136	1.7	256	1.8
30 – < 45	1186	4.8	272	4.3	344	4.4	616	4.4
45 – < 60	3180	13.0	685	10.8	816	10.5	1501	10.6
≥ 60	16642	68.0	4127	65.0	5134	66.0	9261	65.5
Missing	2253	9.2	983	15.5	1136	14.6	2119	15.0
***Total cholesterol, mmol/L								
N	9213		1596		1705		3301	
Mean (SD)	4.5 (1.2)		4.4 (1.3)		4.3 (1.3)		4.4 (1.3)	
Median (min, max)	4.3 (2.0, 24.2)		4.2 (2.0, 25.0)		4.1 (2.2, 23.0)		4.1 (2.0, 25.0)	
Not available, No. (%)	3221	24.0	696	25.8	893	30.0	1589	28.0
Missing, No. (%)	1030	7.6	410	15.2	378	12.8	788	13.8
***LDL levels, mmol/L								
N	9101		1555		1668		3223	
Mean (SD)	2.6 (1.1)		2.5 (1.1)		2.5 (1.1)		2.5 (1.1)	
Median (min, max)	2.4 (0.7, 20.0)		2.3 (0.8, 14.0)		2.2 (0.8, 16.0)		2.2 (0.8, 16.0)	
Not available, No. (%)	3323	24.6	725	26.8	937	31.4	1662	29.2
Missing, No. (%)	1040	7.8	422	15.6	371	12.4	793	14.0
Previous intervention								
Previous PCI, No. (%)								
Yes	4953	20.3	997	15.6	1284	16.4	2281	16.2
No	19488	79.7	5356	84.4	6499	83.6	11855	83.8
Missing	18	0.0	0	0	0	0	0	0
Previous CABG, No. (%)								
Yes	973	4.0	231	3.6	229	3.0	460	3.2
No	23462	96.0	6122	96.4	7554	97.0	13676	96.8
Missing	24	0.0	0	0	0	0	0	0

*Coronary artery disease is defined as "Yes" for any of the following co-morbidities: 1) History of myocardial infarction, 2) Documented CAD > 50% stenosis, 3) New onset angina (less than 2 weeks)

**Glomerular filtration rate calculated based on MDRD formula

***Mean (SD) of Total Cholesterol, mmol/L and LDL levels, mmol/L is of patients who had documented coronary artery disease

Note: 'Not known' for coronary artery disease includes patients who do not know their co-morbidities as well as missing data

Table 1.2 Distribution of patients by number of procedures, NCVD-PCI Registry, 2007 – 2014

Year		No. of patients							
		2007 – 2012		2013		2014		2013 – 2014	
		N	%	N	%	N	%	N	%
No. of procedures	1	24459	92.4	6353	91.7	7783	90.6	14136	91.1
	2	1932	7.3	545	7.9	758	8.8	1303	8.4
	3	85	0.3	27	0.4	40	0.5	67	0.4
	4	7	0.0	3	0	5	0.1	8	0.1
	Total	26483	100.0	6928	100.0	8586	100.0	15514	100.0

Table 1.3.1 Distribution of patients who underwent PCI, by SDP, NCVD-PCI Registry, 2007 – 2014*

No.	Source data provider	2007 – 2012 Total no. of patients = 24459		2013 Total no. of patients = 6353		2014 Total no. of patients = 7783		2013 – 2014 Total no. of patients = 14136	
		No.	%	No.	%	No.	%	No.	%
1	Pusat Perubatan Universiti Malaya, Kuala Lumpur	1184	4.8	55	0.8	810	10.4	865	6.2
2	Institut Jantung Negara, Kuala Lumpur	14183	58.1	2651	41.8	2834	36.4	5485	38.8
3	Hospital Pulau Pinang, Pulau Pinang	2099	8.7	432	6.8	480	6.2	912	6.4
4	Hospital Umum Sarawak, Sarawak	2723	11.3	687	10.8	665	8.6	1352	9.6
5	Hospital Sultanah Aminah, Johor	1777	7.3	434	6.8	445	5.8	879	6.2
6	Hospital Sultanah Bahiyah, Kedah	1042	4.2	393	6.2	531	6.8	924	6.6
7	Hospital Queen Elizabeth, Sabah	445	1.8						
8	Hospital Pakar KPJ Selangor, Selangor	70	0.2						
9	Hospital Serdang, Selangor	148	0.6	454	7.2	247	3.2	701	5.0
10	Pusat Perubatan Universiti Kebangsaan Malaysia, Kuala Lumpur	20	0.0						
11	Pusat Perubatan Mahkota, Melaka	12	0.0						
12	Hospital Sultanah Nur Zahirah, Terengganu	110	0.4	129	2.0	151	2.0	280	2.0
13	Hospital Tengku Ampuan Afzan, Pahang	28	0.2	197	3.2	261	3.4	458	3.2
14	Pusat Perubatan Subang Jaya, Selangor	91	0.4	83	1.4	127	1.6	210	1.4
15	Hospital Queen Elizabeth 2, Sabah	508	2.0	542	8.5	521	6.5	1063	7.5
16	Hospital Pantai Ipoh, Perak	19	0.0	82	1.2	9	0.2	91	0.6
17	Hospital Raja Permaisuri Bainun, Perak			176	2.7	419	5.3	595	4.1
18	Hospital Raja Perempuan Zainab II, Kelantan			2	0.0	15	0.2	17	0.2
19	UiTM Sg Buloh, Selangor			36	0.6	268	3.4	304	2.2
Total		24459	100.0	6353	100.0	7783	100.0	14136	100.0

*Each SDP started contributing data at different time periods

Table 1.3.2 Distribution of PCI procedures performed by Source Data Providers (SDPs), NCVD-PCI Registry, 2007 – 2014*

No.	Source data provider	2007 – 2012 Total no. of patients = 26483		2013 Total no. of patients = 6928		2014 Total no. of patients = 8586		2013 – 2014 Total no. of patients = 15514	
		No.	%	No.	%	No.	%	No.	%
1	Pusat Perubatan Universiti Malaya, Kuala Lumpur	1293	4.8	55	0.8	990	11.6	1045	6.8
2	Institut Jantung Negara, Kuala Lumpur	15375	58.0	2941	42.4	3114	36.2	6055	39.0
3	Hospital Pulau Pinang, Pulau Pinang	2369	9.0	484	7.0	546	6.4	1030	6.6
4	Hospital Umum Sarawak, Sarawak	2952	11.2	747	10.8	716	8.4	1463	9.4
5	Hospital Sultanah Aminah, Johor	1902	7.2	477	6.8	470	5.4	947	6.2
6	Hospital Sultanah Bahiyah, Kedah	1118	4.2	425	6.2	570	6.6	995	6.4
7	Hospital Queen Elizabeth, Sabah	453	1.8						
8	Hospital Pakar KPJ Selangor, Selangor	72	0.2						
9	Hospital Serdang, Selangor	148	0.6	475	6.8	253	3.0	728	4.6
10	Pusat Perubatan Universiti Kebangsaan Malaysia, Kuala Lumpur	20	0.0						
11	Pusat Perubatan Mahkota, Melaka	12	0.0						
12	Hospital Sultanah Nur Zahirah, Terengganu	111	0.4	138	2.0	158	1.8	296	2.0
13	Hospital Tengku Ampuan Afzan, Pahang	29	0.2	213	3.0	282	3.2	495	3.2
14	Pusat Perubatan Subang Jaya, Selangor	92	0.4	83	1.2	129	1.5	212	1.3
15	Hospital Queen Elizabeth 2, Sabah	518	2.0	587	8.5	581	6.7	1168	7.5
16	Hospital Pantai Ipoh, Perak	19	0.0	82	1.3	9	0.2	91	0.6
17	Hospital Raja Permaisuri Bainun, Perak			182	2.6	466	5.4	648	4.2
18	Hospital Raja Perempuan Zainab II, Kelantan			2	0.0	16	0.2	18	0.2
19	UiTM Hospital Sg Buloh, Selangor			37	0.6	286	3.4	323	2.0
Total		26483	100.0	6928	100.0	8586	100.0	15514	100.0

*Each SDP started contributing data at different time periods

Table 1.4.1 Age-gender distribution of patients who underwent PCI, NCVD-PCI Registry, 2007 – 2014

Age group	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of patients = 24459		Total no. of patients = 6353		Total no. of patients = 7783		Total no. of patients = 14136	
	Male	Female	Male	Female	Male	Female	Male	Female
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
20 – < 30	81 (0.4)	8 (0.2)	28 (0.6)	1 (0.0)	30 (0.4)	3 (0.2)	58 (0.4)	4 (0.2)
30 – < 40	892 (4.4)	63 (1.4)	277 (5.2)	13 (1.2)	368 (5.6)	11 (0.8)	645 (5.4)	24 (1.0)
40 – < 50	4212 (21.0)	446 (10.2)	1001 (19.0)	110 (10.4)	1176 (18.0)	113 (9.0)	2177 (18.4)	223 (9.6)
50 – < 60	7485 (37.3)	1289 (29.4)	2025 (38.2)	330 (31.0)	2446 (37.5)	370 (29.5)	4471 (37.9)	700 (30.2)
60 – < 70	5354 (26.7)	1641 (37.4)	1399 (26.5)	368 (34.6)	1789 (27.5)	480 (38.3)	3188 (27.1)	848 (36.6)
70 – < 80	1887 (9.4)	870 (19.8)	513 (9.7)	218 (20.6)	649 (10.0)	243 (19.4)	1162 (9.8)	461 (19.8)
≥ 80	162 (0.8)	69 (1.6)	47 (0.8)	23 (2.2)	70 (1.0)	35 (2.8)	117 (1.0)	58 (2.6)
Total	20073 (100.0)	4386 (100.0)	5290 (100.0)	1063 (100.0)	6528 (100.0)	1255 (100.0)	11818 (100.0)	2318 (100.0)

Table 1.4.2 Age-gender distribution of patients who underwent PCI, by ethnic group, NCVD-PCI Registry, 2007 – 2014

Gender	Age group	2013					2014				
		Total no. of patients = 6353					Total no. of patients = 7783				
		Malay	Chinese	Indian	Others	Not Available	Malay	Chinese	Indian	Others*	Not Available
No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	
Male	20 – < 30	15 (0.7)	3 (0.2)	8 (0.9)	2 (0.3)	0 (0)	18 (0.6)	1 (0.0)	9 (0.8)	2 (0.4)	0 (0)
	30 – < 40	158 (5.9)	38 (3.4)	42 (4.5)	38 (7.3)	1 (33.3)	215 (6.4)	44 (3.2)	60 (4.7)	48 (8.1)	1 (33.3)
	40 – < 50	524 (19.6)	194 (17.0)	165 (17.4)	117 (22.6)	1 (33.3)	605 (18.2)	195 (14.3)	234 (18.7)	142 (23.9)	0 (0)
	50 – < 60	1039 (38.8)	386 (33.8)	392 (41.4)	207 (40.0)	1 (33.4)	1311 (39.4)	442 (32.5)	478 (38.2)	214 (36.2)	1 (33.3)
	60 – < 70	692 (25.8)	351 (30.6)	246 (26.0)	110 (21.2)	0 (0)	870 (26.2)	450 (33.0)	344 (27.6)	125 (21.2)	0 (0)
	70 – < 80	232 (8.6)	159 (13.8)	82 (8.6)	40 (7.8)	0 (0)	271 (8.2)	211 (15.4)	113 (9.0)	53 (9.0)	1 (33.4)
	≥ 80	18 (0.6)	13 (1.2)	12 (1.2)	4 (0.8)	0 (0)	30 (1.0)	21 (1.6)	12 (1.0)	7 (1.2)	0 (0)
	Total	2678 (100.0)	1144 (100.0)	947 (100.0)	518 (100.0)	3 (100.0)	3320 (100.0)	1364 (100.0)	1250 (100.0)	591 (100.0)	3 (100.0)
Female	20 – < 30	1 (0.2)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.4)	1 (0.4)	0 (0)	0 (0)	0 (0)
	30 – < 40	7 (1.6)	2 (0.7)	2 (0.8)	2 (1.8)	0 (0)	7 (1.2)	1 (0.4)	3 (1.0)	0 (0)	0 (0)
	40 – < 50	56 (12.6)	10 (3.7)	28 (11.6)	16 (14.9)	0 (0)	54 (9.4)	14 (4.6)	35 (11.8)	10 (12.0)	0 (0)
	50 – < 60	156 (35.2)	64 (23.8)	76 (31.6)	32 (29.7)	2 (100.0)	192 (33.4)	58 (19.4)	95 (32.0)	25 (30.2)	0 (0)
	60 – < 70	141 (31.8)	109 (40.6)	81 (33.8)	37 (34.2)	0 (0)	224 (38.8)	109 (36.4)	114 (38.4)	33 (39.8)	0 (0)
	70 – < 80	81 (18.2)	72 (26.8)	46 (19.2)	19 (17.6)	0 (0)	89 (15.4)	98 (32.8)	42 (14.2)	14 (16.8)	0 (0)
	≥ 80	2 (0.4)	12 (4.4)	7 (3.0)	2 (1.8)	0 (0)	8 (1.4)	18 (6.0)	8 (2.6)	1 (1.2)	0 (0)
	Total	444 (100.0)	269 (100.0)	240 (100.0)	108 (100.0)	2 (100.0)	576 (100.0)	299 (100.0)	297 (100.0)	83 (100.0)	0 (0)

*Others include Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, Punjabi, Other Malaysian, and Foreigner

Gender	Age group	^2007 – 2012					2013 – 2014				
		Total no. of patients = 24459					Total no. of patients = 14136				
		Malay	Chinese	Indian	Others	**Not Available	Malay	Chinese	Indian	Others*	Not Available
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Male	20 – < 30	43 (0.2) <i>(0.4)</i>	11 (0.0) <i>(0.2)</i>	17 (0.0) <i>(0.4)</i>	10 (0.0) <i>(0.8)</i>	0 (0) <i>(0)</i>	33 (0.6)	4 (0.2)	17 (0.8)	4 (0.4)	0 (0)
	30 – < 40	501 (2.4) <i>(5.1)</i>	132 (0.6) <i>(2.9)</i>	176 (0.8) <i>(4.2)</i>	82 (0.4) <i>(6.1)</i>	1 (0.0) <i>(4.8)</i>	373 (6.2)	82 (3.2)	102 (4.6)	86 (7.8)	2 (33.4)
	40 – < 50	2236 (11.2) <i>(22.4)</i>	752 (3.8) <i>(16.6)</i>	879 (4.4) <i>(21.0)</i>	341 (1.7) <i>(25.4)</i>	4 (0.0) <i>(19.0)</i>	1129 (18.8)	389 (15.6)	399 (18.3)	259 (23.3)	1 (16.6)
	50 – < 60	3878 (19.5) <i>(38.9)</i>	1515 (7.6) <i>(33.3)</i>	1632 (8.3) <i>(38.9)</i>	453 (2.3) <i>(33.8)</i>	7 (0.0) <i>(33.3)</i>	2350 (39.2)	828 (32.9)	870 (39.7)	421 (37.9)	2 (33.4)
	60 – < 70	2446 (12.2) <i>(24.5)</i>	1473 (7.4) <i>(32.4)</i>	1101 (5.5) <i>(26.2)</i>	326 (1.7) <i>(24.3)</i>	8 (0.0) <i>(38.1)</i>	1562 (26.0)	801 (31.9)	590 (26.8)	235 (21.2)	0 (0)
	70 – < 80	811 (4.0) <i>(8.1)</i>	601 (3.0) <i>(13.3)</i>	359 (1.8) <i>(8.6)</i>	115 (0.6) <i>(8.6)</i>	1 (0.0) <i>(4.8)</i>	503 (8.4)	370 (14.8)	195 (8.8)	93 (8.4)	1 (16.6)
	≥ 80	58 (0.2) <i>(0.6)</i>	59 (0.2) <i>(1.3)</i>	31 (0.2) <i>(0.7)</i>	14 (0.0) <i>(1.0)</i>	0 (0) <i>(0)</i>	48 (0.8)	34 (1.4)	24 (1.0)	11 (1.0)	0 (0)
	Total	9973 (49.7) <i>(100.0)</i>	4543 (22.6) <i>(100.0)</i>	4195 (21.0) <i>(100.0)</i>	1341 (6.7) <i>(100.0)</i>	21 (0.0) <i>(100.0)</i>	5998 (100.0)	2508 (100.0)	2197 (100.0)	1109 (100.0)	6 (100.0)
Female	20 – < 30	7 (0.2) <i>(0.4)</i>	0 (0) <i>(0)</i>	0 (0) <i>(0)</i>	1 (0.0) <i>(0.3)</i>	0 (0) <i>(0)</i>	3 (0.2)	1 (0.2)	0 (0)	0 (0)	0 (0)
	30 – < 40	37 (0.8) <i>(2.0)</i>	6 (0.2) <i>(0.5)</i>	16 (0.4) <i>(1.5)</i>	3 (0.0) <i>(1.0)</i>	1 (0.0) <i>(25.0)</i>	14 (1.4)	3 (0.6)	5 (1.0)	2 (1.0)	0 (0)
	40 – < 50	217 (5.0) <i>(11.6)</i>	55 (1.2) <i>(5.0)</i>	133 (3.0) <i>(12.1)</i>	40 (1.0) <i>(13.2)</i>	1 (0.0) <i>(25.0)</i>	110 (10.8)	24 (4.2)	63 (11.7)	26 (13.7)	0 (0)
	50 – < 60	627 (14.3) <i>(33.6)</i>	235 (5.4) <i>(21.2)</i>	337 (7.7) <i>(30.6)</i>	90 (2.0) <i>(29.6)</i>	0 (0) <i>(0)</i>	348 (34.2)	122 (21.4)	171 (31.7)	57 (29.9)	2 (100.0)
	60 – < 70	677 (15.5) <i>(36.2)</i>	456 (10.5) <i>(41.2)</i>	405 (9.3) <i>(36.7)</i>	101 (2.5) <i>(33.2)</i>	2 (0.0) <i>(50.0)</i>	365 (35.8)	218 (38.4)	195 (36.4)	70 (36.6)	0 (0)
	70 – < 80	291 (6.6) <i>(15.6)</i>	326 (7.4) <i>(29.5)</i>	188 (4.2) <i>(17.1)</i>	65 (1.4) <i>(21.4)</i>	0 (0) <i>(0)</i>	170 (16.6)	170 (30.0)	88 (16.4)	33 (17.2)	0 (0)
	≥ 80	12 (0.2) <i>(0.6)</i>	29 (0.6) <i>(2.6)</i>	24 (0.6) <i>(2.0)</i>	4 (0.0) <i>(1.3)</i>	0 (0) <i>(0)</i>	10 (1.0)	30 (5.2)	15 (2.8)	3 (1.6)	0 (0)
	Total	1868 (42.6) <i>(100.0)</i>	1107 (25.3) <i>(100.0)</i>	1103 (25.2) <i>(100.0)</i>	304 (6.9) <i>(100.0)</i>	4 (0.0) <i>(100.0)</i>	1020 (100.0)	568 (100.0)	537 (100.0)	191 (100.0)	2 (100.0)

*Others include Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, Punjabi, Other Malaysian, and Foreigner

**Missing and Not Available were added together

^Percentage was presented differently in the 2007 – 2012 and 2013 – 2014 results. Percentage within the group was recalculated for 2007 – 2012 data and presented in italic font style

Table 1.4.3 Age-gender distribution of patients who underwent PCI, by pre-morbid diabetes, NCVD-PCI Registry, 2007 – 2014

Gender	Age group	2013						2014					
		Total no. of patients = 6353						Total no. of patients = 7783					
		Pre-morbid diabetes						Pre-morbid diabetes					
		Diabetic		Non-Diabetic		Not known		Diabetic		Non-Diabetic		Not known	
No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Male	20 – < 30	5	0.2	19	0.6	4	1.2	6	0.2	21	0.6	3	0.6
	30 – < 40	72	3.4	180	6.4	25	7.2	89	3.4	240	7.0	39	8.0
	40 – < 50	326	15.4	591	20.9	84	23.8	390	14.7	694	20.5	92	18.6
	50 – < 60	834	39.6	1067	37.7	124	35.2	1024	38.7	1234	36.5	188	38.2
	60 – < 70	635	30.2	681	24	83	23.6	819	31.0	842	24.8	128	26.0
	70 – < 80	215	10.2	269	9.6	29	8.2	289	11.0	322	9.4	38	7.8
	≥ 80	20	1.0	24	0.8	3	0.8	27	1.0	39	1.2	4	0.8
	Total	2107	100.0	2831	100.0	352	100.0	2644	100.0	3392	100.0	492	100.0
Female	20 – < 30	0	0	1	0.2	0	0	1	0.2	2	0.4	0	0
	30 – < 40	8	1.2	3	0.8	2	4.4	6	0.8	4	0.8	1	1.6
	40 – < 50	62	9.8	43	11.0	5	11.2	63	8.4	44	9.8	6	10.1
	50 – < 60	220	35.0	100	25.6	10	22.2	224	29.8	127	28.6	19	31.6
	60 – < 70	222	35.5	130	33.2	16	35.6	300	40.0	159	35.8	21	35.1
	70 – < 80	103	16.5	105	26.8	10	22.2	140	18.6	94	21.2	9	15.0
	≥ 80	12	2.0	9	2.4	2	4.4	16	2.2	15	3.4	4	6.6
	Total	627	100.0	391	100.0	45	100.0	750	100.0	445	100.0	60	100.0

Gender	Age group	^2007 – 2012				2013 – 2014		
		Total no. of patients = 24459				Total no. of patients = 14136		
		Pre-morbid diabetes				Pre-morbid diabetes		
		Diabetic	Non-Diabetic	Not known	Missing	Diabetic	Non-Diabetic	Not known
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Male	20 – < 30	10 (0.0) <i>(0.1)</i>	59 (0.2) <i>(0.5)</i>	12 (0.0) <i>(2.2)</i>	0 (0) <i>(0)</i>	11 (0.2)	40 (0.6)	7 (0.8)
	30 – < 40	245 (1.2) <i>(2.9)</i>	616 (3.0) <i>(5.6)</i>	31 (0.2) <i>(5.7)</i>	0 (0) <i>(0)</i>	161 (3.4)	420 (6.9)	64 (7.6)
	40 – < 50	1484 (7.4) <i>(17.5)</i>	2623 (13.0) <i>(23.8)</i>	103 (0.6) <i>(18.9)</i>	2 (0.0) <i>(11.1)</i>	716 (15.0)	1285 (20.7)	176 (20.8)
	50 – < 60	3374 (16.8) <i>(39.7)</i>	3906 (19.5) <i>(35.5)</i>	196 (1.1) <i>(35.9)</i>	9 (0.0) <i>(50.0)</i>	1858 (39.2)	2301 (37.0)	312 (37.0)
	60 – < 70	2490 (12.4) <i>(29.3)</i>	2718 (13.7) <i>(24.7)</i>	140 (0.6) <i>(25.6)</i>	6 (0.0) <i>(33.3)</i>	1454 (30.6)	1523 (24.4)	211 (25.0)
	70 – < 80	831 (4.2) <i>(9.8)</i>	997 (5.1) <i>(9.1)</i>	58 (0.2) <i>(10.6)</i>	1 (0.0) <i>(5.6)</i>	504 (10.6)	591 (9.4)	67 (8.0)
	≥ 80	67 (0.4) <i>(0.7)</i>	89 (0.4) <i>(0.8)</i>	6 (0.0) <i>(1.1)</i>	0 (0) <i>(0)</i>	47 (1.0)	63 (1.0)	7 (0.8)
	Total	8501 (42.4) <i>(100.0)</i>	11008 (54.9) <i>(100.0)</i>	546 (2.7) <i>(100.0)</i>	18 (0.0) <i>(100.0)</i>	4751 (100.0)	6223 (100.0)	844 (100.0)
Female	20 – < 30	2 (0.0) <i>(0.1)</i>	6 (0.2) <i>(0.4)</i>	0 (0) <i>(0)</i>	0 (0) <i>(0)</i>	1 (0.0)	3 (0.4)	0 (0)
	30 – < 40	38 (0.8) <i>(1.4)</i>	23 (0.6) <i>(1.4)</i>	2 (0.0) <i>(2.4)</i>	0 (0) <i>(0)</i>	14 (1.1)	7 (0.8)	3 (2.8)
	40 – < 50	278 (6.4) <i>(10.4)</i>	154 (3.6) <i>(9.4)</i>	13 (0.2) <i>(15.9)</i>	1 (0.0) <i>(33.3)</i>	125 (9.1)	87 (10.4)	11 (10.5)
	50 – < 60	832 (19.0) <i>(31.2)</i>	435 (10.0) <i>(26.6)</i>	21 (0.4) <i>(25.6)</i>	1 (0.0) <i>(33.3)</i>	444 (32.2)	227 (27.2)	29 (27.7)
	60 – < 70	1011 (23.1) <i>(38.0)</i>	604 (13.9) <i>(36.9)</i>	25 (0.6) <i>(30.5)</i>	1 (0.0) <i>(33.4)</i>	522 (38.0)	289 (34.6)	37 (35.2)
	70 – < 80	464 (10.6) <i>(17.4)</i>	387 (8.8) <i>(23.6)</i>	19 (0.4) <i>(23.2)</i>	0 (0) <i>(0)</i>	243 (17.6)	199 (23.8)	19 (18.0)
	≥ 80	39 (0.8) <i>(1.5)</i>	28 (0.6) <i>(1.7)</i>	2 (0.0) <i>(2.4)</i>	0 (0) <i>(0)</i>	28 (2.0)	24 (2.8)	6 (5.8)
	Total	2664 (60.7) <i>(100.0)</i>	1637 (37.7) <i>(100.0)</i>	82 (1.6) <i>(100.0)</i>	3 (0.0) <i>(100.0)</i>	1377 (100.0)	836 (100.0)	105 (100.0)

^Percentage was presented differently in the 2007 – 2012 and 2013 – 2014 results. Percentage within the group was recalculated for 2007 – 2012 data and presented in italic font style

Table 1.4.4 Age-gender distribution of patients who underwent PCI, by pre-morbid hypertension, NCVd-PCI Registry, 2007 – 2014

Gender	Age group	2013						2014					
		Total no. of patients = 6353						Total no. of patients = 7783					
		Pre-morbid hypertension						Pre-morbid hypertension					
		Hypertensive		Non-hypertensive		Not known		Hypertensive		Non-hypertensive		Not known	
No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)		
Male	20 – < 30	7	0.2	17	1.0	4	1.4	7	0.2	18	1.0	5	1.2
	30 – < 40	109	3.2	147	9.4	21	7.2	139	3.4	190	9.8	39	9.4
	40 – < 50	540	15.8	385	24.4	76	25.7	584	14.0	496	25.3	96	23.0
	50 – < 60	1318	38.7	597	37.8	110	37.2	1616	38.7	683	34.9	147	35.4
	60 – < 70	1014	29.7	328	20.8	57	19.3	1265	30.3	421	21.6	103	24.8
	70 – < 80	392	11.4	95	6.0	26	8.8	506	12.2	119	6.2	24	5.8
	≥ 80	35	1.0	11	0.6	1	0.4	46	1.2	22	1.2	2	0.4
	Total	3415	100.0	1580	100.0	295	100.0	4163	100.0	1949	100.0	416	100.0
Female	20 – < 30	0	0	1	0.6	0	0	1	0.2	2	1.0	0	0
	30 – < 40	9	1.1	2	1.2	2	5.2	9	0.9	1	0.4	1	2.0
	40 – < 50	77	9.1	27	16.4	6	15.8	69	6.9	38	18.4	6	12.0
	50 – < 60	250	29.0	70	42.4	10	26.4	284	28.4	74	36.0	12	24.0
	60 – < 70	322	37.4	38	23.0	8	21.0	390	39.0	67	32.6	23	46.0
	70 – < 80	183	21.2	25	15.2	10	26.4	218	21.8	19	9.2	6	12.0
	≥ 80	19	2.2	2	1.2	2	5.2	28	2.8	5	2.4	2	4.0
	Total	860	100.0	165	100.0	38	100.0	999	100.0	206	100.0	50	100.0

Gender	Age group	^2007 – 2012				2013 – 2014		
		Total no. of patients = 24459				Total no. of patients = 14136		
		Pre-morbid hypertension				Pre-morbid hypertension		
		Hypertensive	Non-hypertensive	Not known	Missing	Hypertensive	Non-hypertensive	Not known
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Male	20 – < 30	20 (0.0) <i>(0.1)</i>	51 (0.2) <i>(1.0)</i>	10 (0.0) <i>(2.2)</i>	0 (0) <i>(0)</i>	14 (0.2)	35 (1.0)	9 (1.2)
	30 – < 40	437 (2.2) <i>(3.1)</i>	419 (2.0) <i>(7.7)</i>	35 (0.2) <i>(7.6)</i>	1 (0.0) <i>(7.1)</i>	248 (3.2)	337 (9.6)	60 (8.4)
	40 – < 50	2545 (12.7) <i>(18.0)</i>	1567 (7.8) <i>(28.8)</i>	99 (0.4) <i>(21.5)</i>	1 (0.0) <i>(7.1)</i>	1124 (14.9)	881 (25.0)	172 (24.2)
	50 – < 60	5355 (26.7) <i>(37.8)</i>	1961 (9.9) <i>(36.1)</i>	162 (0.9) <i>(35.2)</i>	7 (0.0) <i>(50.0)</i>	2934 (38.9)	1280 (36.2)	257 (36.2)
	60 – < 70	4143 (20.7) <i>(29.3)</i>	1103 (5.4) <i>(20.3)</i>	104 (0.6) <i>(22.6)</i>	4 (0.0) <i>(28.7)</i>	2279 (30.0)	749 (21.2)	160 (22.6)
	70 – < 80	1531 (7.7) <i>(10.8)</i>	307 (1.6) <i>(5.6)</i>	48 (0.2) <i>(10.4)</i>	1 (0.0) <i>(7.1)</i>	898 (11.8)	214 (6.0)	50 (7.0)
	≥ 80	128 (0.6) <i>(0.9)</i>	32 (0.2) <i>(0.5)</i>	2 (0.0) <i>(0.5)</i>	0 (0) <i>(0)</i>	81 (1.0)	33 (1.0)	3 (0.4)
	Total	14159 (70.6) <i>(100.0)</i>	5440 (27.1) <i>(100.0)</i>	460 (2.3) <i>(100.0)</i>	14 (0.0) <i>(100.0)</i>	7578 (100.0)	3529 (100.0)	711 (100.0)
Female	20 – < 30	5 (0.2) <i>(0.1)</i>	3 (0.0) <i>(0.5)</i>	0 (0) <i>(0)</i>	0 (0) <i>(0)</i>	1 (0)	3 (0.8)	0 (0)
	30 – < 40	39 (0.8) <i>(1.1)</i>	22 (0.6) <i>(3.6)</i>	2 (0.0) <i>(3.5)</i>	0 (0) <i>(0)</i>	18 (1.0)	3 (0.8)	3 (3.4)
	40 – < 50	338 (7.8) <i>(9.1)</i>	95 (2.2) <i>(15.7)</i>	11 (0.2) <i>(19.3)</i>	2 (0.0) <i>(50.0)</i>	146 (7.7)	65 (17.6)	12 (13.6)
	50 – < 60	1069 (24.4) <i>(28.7)</i>	203 (4.6) <i>(33.5)</i>	16 (0.4) <i>(28.1)</i>	1 (0.0) <i>(25.0)</i>	534 (28.7)	144 (38.8)	22 (25.0)
	60 – < 70	1443 (33.0) <i>(38.8)</i>	180 (4.2) <i>(29.7)</i>	17 (0.4) <i>(29.8)</i>	1 (0.0) <i>(25.0)</i>	712 (38.4)	105 (28.4)	31 (35.2)
	70 – < 80	768 (17.6) <i>(20.7)</i>	92 (2.0) <i>(15.2)</i>	10 (0.2) <i>(17.5)</i>	0 (0) <i>(0)</i>	401 (21.6)	44 (11.8)	16 (18.2)
	≥ 80	57 (1.2) <i>(1.5)</i>	11 (0.2) <i>(1.8)</i>	1 (0.0) <i>(1.8)</i>	0 (0) <i>(0)</i>	47 (2.6)	7 (1.8)	4 (4.6)
	Total	3719 (85.0) <i>(100.0)</i>	606 (13.8) <i>(100.0)</i>	57 (1.2) <i>(100.0)</i>	4 (0.0) <i>(100.0)</i>	1859 (100.0)	371 (100.0)	88 (100.0)

[^]Percentage was presented differently in the 2007 – 2012 and 2013 – 2014 results. Percentage within the group was recalculated for 2007 – 2012 data and presented in italic font style

Table 1.4.5 Age-gender distribution of patients who underwent PCI, by pre-morbid dyslipidaemia, NCVD-PCI Registry, 2007 – 2014

Gender	Age group	2013						2014					
		Total no. of patients = 6353						Total no. of patients = 7783					
		Pre-morbid dyslipidaemia						Pre-morbid dyslipidaemia					
		Yes		No		Not known		Yes		No		Not known	
No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Male	20 – < 30	12	0.4	10	0.6	6	1.2	14	0.4	9	0.4	7	1.1
	30 – < 40	139	4.4	102	6.2	36	7.2	178	4.8	143	6.8	47	7.3
	40 – < 50	571	18.2	326	19.8	104	21.0	579	15.4	456	21.6	141	21.8
	50 – < 60	1197	38.1	641	38.8	187	37.6	1456	38.5	761	36.0	229	35.4
	60 – < 70	887	28.3	392	23.8	120	24.2	1101	29.1	532	25.2	156	24.2
	70 – < 80	311	9.8	161	9.8	41	8.2	397	10.6	189	9.0	63	9.8
	≥ 80	28	0.8	16	1.0	3	0.6	45	1.2	22	1.0	3	0.4
	Total	3145	100.0	1648	100.0	497	100.0	3770	100.0	2112	100.0	646	100.0
Female	20 – < 30	0	0	1	0.4	0	0	0	0	3	0.8	0	0
	30 – < 40	6	0.9	5	1.6	2	2.2	8	1.0	2	0.6	1	1.2
	40 – < 50	60	8.9	41	13.6	9	9.4	66	8.2	38	10.6	9	10.4
	50 – < 60	217	32.6	86	28.4	27	28.4	253	31.2	96	26.6	21	24.4
	60 – < 70	234	35.2	104	34.4	30	31.6	301	37.2	139	38.6	40	46.6
	70 – < 80	134	20.2	61	20.2	23	24.2	161	20.0	70	19.4	12	14.0
	≥ 80	15	2.2	4	1.4	4	4.2	20	2.4	12	3.4	3	3.4
	Total	666	100.0	302	100.0	95	100.0	809	100.0	360	100.0	86	100.0

Gender	Age group	^2007 – 2012				2013 – 2014		
		Total no. of patients = 24459				Total no. of patients = 14136		
		Pre-morbid dyslipidaemia				Pre-morbid dyslipidaemia		
		Yes	No	Not known	Missing	Yes	No	Not known
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Male	20 – < 30	37 (0.2) <i>(0.3)</i>	30 (0.2) <i>(0.6)</i>	14 (0.0) <i>(1.4)</i>	0 (0) <i>(0)</i>	26 (0.4)	19 (0.6)	13 (1.2)
	30 – < 40	592 (3.0) <i>(4.1)</i>	251 (1.2) <i>(5.3)</i>	48 (0.2) <i>(4.9)</i>	1 (0.0) <i>(3.5)</i>	317 (4.6)	245 (6.6)	83 (7.2)
	40 – < 50	2903 (14.4) <i>(20.3)</i>	1097 (5.5) <i>(23.1)</i>	205 (1.1) <i>(21.1)</i>	7 (0.0) <i>(24.1)</i>	1150 (16.6)	782 (20.7)	245 (21.4)
	50 – < 60	5460 (27.2) <i>(38.1)</i>	1665 (8.3) <i>(35.1)</i>	345 (1.9) <i>(35.5)</i>	15 (0.0) <i>(51.7)</i>	2653 (38.4)	1402 (37.1)	416 (36.4)
	60 – < 70	3887 (19.4) <i>(27.1)</i>	1207 (6.1) <i>(25.4)</i>	255 (1.3) <i>(26.2)</i>	5 (0.0) <i>(17.2)</i>	1988 (28.8)	924 (24.6)	276 (24.2)
	70 – < 80	1343 (6.6) <i>(9.4)</i>	443 (2.2) <i>(9.3)</i>	100 (0.4) <i>(10.3)</i>	1 (0.0) <i>(3.5)</i>	708 (10.2)	350 (9.4)	104 (9.0)
	≥ 80	105 (0.6) <i>(0.7)</i>	51 (0.2) <i>(1.2)</i>	6 (0.0) <i>(0.6)</i>	0 (0) <i>(0)</i>	73 (1.0)	38 (1.0)	6 (0.6)
	Total	14327 (71.4) <i>(100.0)</i>	4744 (23.7) <i>(100.0)</i>	973 (4.9) <i>(100.0)</i>	29 (0.0) <i>(100.0)</i>	6915 (100.0)	3760 (100.0)	1143 (100.0)
Female	20 – < 30	5 (0.2) <i>(0.2)</i>	3 (0.0) <i>(0.3)</i>	0 (0) <i>(0)</i>	0 (0) <i>(0)</i>	0 (0)	4 (0.6)	0 (0)
	30 – < 40	43 (1.0) <i>(1.3)</i>	15 (0.4) <i>(1.6)</i>	5 (0.2) <i>(2.7)</i>	0 (0) <i>(0)</i>	14 (1.0)	7 (1.0)	3 (1.6)
	40 – < 50	328 (7.4) <i>(10.1)</i>	88 (2.0) <i>(9.4)</i>	28 (0.6) <i>(14.8)</i>	2 (0.0) <i>(25.0)</i>	126 (8.6)	79 (12.0)	18 (10.0)
	50 – < 60	989 (22.6) <i>(30.4)</i>	257 (5.8) <i>(27.5)</i>	40 (1.0) <i>(21.2)</i>	3 (0.0) <i>(37.5)</i>	470 (31.8)	182 (27.4)	48 (26.6)
	60 – < 70	1224 (28.0) <i>(37.6)</i>	344 (7.8) <i>(36.8)</i>	71 (1.6) <i>(37.6)</i>	2 (0.0) <i>(25.0)</i>	535 (36.2)	243 (36.8)	70 (38.6)
	70 – < 80	623 (14.2) <i>(19.1)</i>	205 (4.6) <i>(22.0)</i>	41 (1.0) <i>(21.7)</i>	1 (0.0) <i>(12.5)</i>	295 (20.0)	131 (19.8)	35 (19.4)
	≥ 80	43 (1.0) <i>(1.3)</i>	22 (0.6) <i>(2.4)</i>	4 (0.0) <i>(2.0)</i>	0 (0) <i>(0)</i>	35 (2.4)	16 (2.4)	7 (3.8)
	Total	3255 (74.4) <i>(100.0)</i>	934 (21.2) <i>(100.0)</i>	189 (4.4) <i>(100.0)</i>	8 (0.0) <i>(100.0)</i>	1475 (100.0)	662 (100.0)	181 (100.0)

^Percentage was presented differently in 2007 – 2012 and 2013 – 2014 results. Percentage within the group was recalculated for 2007 – 2012 data and presented in italic font style

Table 1.4.6 Age-gender distribution of patients who underwent PCI, by family history of premature cardiovascular disease, NCVD-PCI Registry, 2007 – 2014

Gender	Age group	2013						2014					
		Total no. of patients = 6353						Total no. of patients = 7783					
		Family history of premature cardiovascular disease						Family history of premature cardiovascular disease					
		Yes		No		Not known		Yes		No		Not known	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Male	20 – < 30	9	1.6	17	0.4	2	0.2	3	0.4	19	0.4	8	0.6
	30 – < 40	42	7.0	187	5.2	48	4.4	61	9.2	227	5.0	80	6.0
	40 – < 50	140	23.3	637	17.8	224	20.4	150	22.8	765	16.8	261	19.8
	50 – < 60	262	43.7	1344	37.5	419	38.2	259	39.4	1678	37.0	509	38.4
	60 – < 70	114	19.0	992	27.7	293	26.6	141	21.4	1320	29.0	328	24.8
	70 – < 80	30	5.0	383	10.6	100	9.0	41	6.2	482	10.6	126	9.6
	≥ 80	2	0.4	32	0.8	13	1.2	4	0.6	55	1.2	11	0.8
	Total	599	100.0	3592	100.0	1099	100.0	659	100.0	4546	100.0	1323	100.0
Female	20 – < 30	1	1.0	0	0	0	0	0	0	2	0.2	1	0.4
	30 – < 40	3	2.7	4	0.6	6	3.0	0	0	9	1.0	2	0.8
	40 – < 50	13	11.7	81	10.7	16	8.2	22	17.6	68	7.9	23	9.2
	50 – < 60	49	44.1	218	28.7	63	32.4	34	27.2	261	29.7	75	30.2
	60 – < 70	30	27.0	265	35.0	73	37.4	43	34.4	335	38.0	102	41.0
	70 – < 80	15	13.5	171	22.6	32	16.4	23	18.4	177	20.0	43	17.2
	≥ 80	0	0	18	2.4	5	2.6	3	2.4	29	3.2	3	1.2
	Total	111	100.0	757	100.0	195	100.0	125	100.0	881	100.0	249	100.0

Gender	Age group	^2007 – 2012				2013 – 2014		
		Total no. of patients = 24459				Total no. of patients = 14136		
		Family history of premature cardiovascular disease				Family history of premature cardiovascular disease		
		Yes	No	Not known	Missing	Yes	No	Not known
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Male	20 – < 30	25 (0.2) <i>(0.7)</i>	44 (0.2) <i>(0.3)</i>	12 (0.0) <i>(0.5)</i>	0 (0) <i>(0)</i>	12 (1.0)	36 (0.4)	10 (0.4)
	30 – < 40	221 (1.2) <i>(6.4)</i>	590 (3.0) <i>(4.1)</i>	81 (0.4) <i>(3.5)</i>	0 (0) <i>(0)</i>	103 (8.2)	414 (5.0)	128 (5.2)
	40 – < 50	912 (4.6) <i>(26.6)</i>	2878 (14.4) <i>(20.1)</i>	415 (2.0) <i>(18.0)</i>	7 (0.0) <i>(26.0)</i>	290 (23.0)	1402 (17.3)	485 (20.0)
	50 – < 60	1314 (6.6) <i>(38.3)</i>	5262 (26.2) <i>(36.8)</i>	898 (4.4) <i>(38.8)</i>	11 (0.0) <i>(41.0)</i>	521 (41.5)	3022 (37.3)	928 (38.4)
	60 – < 70	735 (3.6) <i>(21.4)</i>	3997 (20.0) <i>(28.0)</i>	615 (3.0) <i>(26.6)</i>	7 (0.0) <i>(26.0)</i>	255 (20.3)	2312 (28.4)	621 (25.6)
	70 – < 80	216 (1.0) <i>(6.3)</i>	1399 (7.0) <i>(9.8)</i>	270 (1.4) <i>(11.7)</i>	2 (0.0) <i>(7.0)</i>	71 (5.6)	865 (10.6)	226 (9.4)
	≥ 80	10 (0.0) <i>(0.3)</i>	131 (0.6) <i>(0.9)</i>	21 (0.2) <i>(0.9)</i>	0 (0) <i>(0)</i>	6 (0.4)	87 (1.0)	24 (1.0)
	Total	3433 (17.2) <i>(100.0)</i>	14301 (71.4) <i>(100.0)</i>	2312 (11.4) <i>(100.0)</i>	27 (0.0) <i>(100.0)</i>	1258 (100)	8138 (100)	2422 (100)
Female	20 – < 30	2 (0.0) <i>(0.3)</i>	6 (0.2) <i>(0.2)</i>	0 (0) <i>(0)</i>	0 (0) <i>(0)</i>	1 (0.4)	2 (0.2)	1 (0.2)
	30 – < 40	25 (0.6) <i>(3.5)</i>	31 (0.8) <i>(1.0)</i>	7 (0.2) <i>(0.2)</i>	0 (0) <i>(0)</i>	3 (1.2)	13 (0.8)	8 (1.8)
	40 – < 50	107 (2.4) <i>(15.0)</i>	272 (6.2) <i>(8.7)</i>	66 (1.6) <i>(12.1)</i>	1 (0.0) <i>(14.3)</i>	35 (14.8)	149 (9.0)	39 (8.9)
	50 – < 60	240 (5.4) <i>(33.4)</i>	899 (20.3) <i>(28.9)</i>	145 (3.4) <i>(26.6)</i>	5 (0.2) <i>(71.4)</i>	83 (35.2)	479 (29.3)	138 (31.1)
	60 – < 70	246 (5.5) <i>(34.3)</i>	1192 (27.1) <i>(38.3)</i>	202 (4.5) <i>(37.0)</i>	1 (0.0) <i>(14.3)</i>	73 (31.0)	600 (36.7)	175 (39.4)
	70 – < 80	93 (2.2) <i>(13.0)</i>	663 (15.2) <i>(21.3)</i>	114 (2.6) <i>(20.9)</i>	0 (0) <i>(0)</i>	38 (16.2)	348 (21.2)	75 (16.8)
	≥ 80	5 (0.2) <i>(0.5)</i>	52 (1.2) <i>(1.6)</i>	12 (0.2) <i>(3.2)</i>	0 (0) <i>(0)</i>	3 (1.2)	47 (2.8)	8 (1.8)
	Total	718 (16.3) <i>(100.0)</i>	3115 (71.0) <i>(100.0)</i>	546 (12.5) <i>(100.0)</i>	7 (0.2) <i>(100.0)</i>	236 (100)	1638 (100)	444 (100)

^Percentage was presented differently in 2007 – 2012 and 2013 – 2014 results. Percentage within the group was recalculated for 2007 – 2012 data and presented in italic font style

Table 1.5.1 Presence of cumulative risk factors, NCVd-PCI Registry, 2007 – 2014

Presence of cumulative risk factors*	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of patients = 24459		Total no. of patients = 6353		Total no. of patients = 7783		Total no. of patients = 14136	
	No.	%	No.	%	No.	%	No.	%
None	483	2.0	162	2.6	240	3.0	402	2.8
1 risk factor	1798	7.4	719	11.4	948	12.2	1667	11.8
2 risk factors	4389	18.0	1422	22.3	1681	21.6	3103	22.0
3 risk factors	7250	29.6	1955	30.7	2194	28.2	4149	29.4
> 3 risk factors	10539	43.0	2095	33.0	2720	35.0	4815	34.0
Total	24459	100.0	6353	100.0	7783	100.0	14136	100.0

*Risk factors were defined as presence of 1) dyslipidaemia, 2) hypertension, 3) diabetes, 4) family history of premature cardiovascular disease, 5) smoking [current smokers and former smokers (quit more than 30 days)], and 6) obesity (BMI >= 23.0)

Table 1.5.2 Presence of cumulative risk factors by gender, NCVd-PCI Registry, 2007 – 2014

Gender	Presence of cumulative risk factors*	2007 – 2012		2013		2014		2013 – 2014	
		Total no. of patients = 24459		Total no. of patients = 6353		Total no. of patients = 7783		Total no. of patients = 14136	
		No.	%	No.	%	No.	%	No.	%
Male	None	388	2.0	125	2.4	199	3.0	324	2.8
	1 risk factor	1482	7.4	614	11.6	811	12.4	1425	12.0
	2 risk factors	3503	17.4	1163	22.0	1368	21.0	2531	21.4
	3 risk factors	5787	28.8	1569	29.6	1801	27.6	3370	28.6
	> 3 risk factors	8913	44.4	1819	34.4	2349	36.0	4168	35.2
	Total	20073	100.0	5290	100.0	6528	100.0	11818	100.0
Female	None	95	2.2	37	3.4	41	3.2	78	3.4
	1 risk factor	316	7.2	105	9.8	137	10.9	242	10.4
	2 risk factors	886	20.2	259	24.4	313	24.9	572	24.6
	3 risk factors	1463	33.4	386	36.4	393	31.4	779	33.6
	> 3 risk factors	1626	37.0	276	26.0	371	29.6	647	28.0
	Total	4386	100.0	1063	100.0	1255	100.0	2318	100.0

*Risk factors were defined as presence of 1) dyslipidaemia, 2) hypertension, 3) diabetes, 4) family history of premature cardiovascular disease, 5) smoking [included current smokers and former smokers (quit more than 30 days)], and 6) obesity (BMI >= 23.0)

CLINICAL PRESENTATIONS AND INVESTIGATIONS

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Summary

1. Majority of patients (76.0%) had a low TIMI risk index.
2. Atrial fibrillation in patients undergoing PCI is 1.2%.
3. A rising trend of patients with unstable angina and STEMI-Killip IV undergoing PCI.
4. Thirty-five percent (35.0%) of PCIs were performed in patients with ACS and 57.5% of these were STEMI patients. Anterior STEMI (56.2%) remains the predominant presentation of all STEMI PCIs.
5. When we compare the data between the 2007 – 2012 and 2013 – 2014 periods for STEMI PCIs, we see improvements in all quality indicator times.

This chapter will deal with the clinical presentation and relevant investigations at the time of PCI for patients enrolled in the registry between 2013 – 2014. Overall, there were 15,514 procedures during the years studied (2013 – 2014). In comparison, there were 11,621 in 2007 – 2009 and 14,862 in 2010 – 2012.

Heart rate and blood pressure were recorded at the start of each procedure. The TIMI risk index (TRI) were analysed for low, intermediate, and high (< 30, 30 – 70 and > 70) risks, respectively. This index is predictive of 30-day and long term mortality in ACS. Functional ischaemia relates to information obtained from either stress testing or imaging pre-procedure. Time to treatment follows current practice standards.

Only 10.7% of patients who underwent elective PCI had a functional ischaemic test before the procedure. As there was a large component of missing data in this category, further interpretation cannot be made. We are reminded, however, that many patients undergoing elective PCI could benefit from prior ischaemic testing if the symptoms were atypical, and if the burden of ischaemia was unclear. [Table 2.1]

The mean systolic blood pressure for the years 2013 – 2014 was 136 mmHg (SD 25 mmHg), and mean diastolic blood pressure was 76 mmHg (SD 13 mmHg). Seventy-six percent of all PCI patients in 2013 – 2014 had a TRI < 30. This is a reduction compared to the period of 2007 – 2012, in which 82.2% of all PCI patients had a TRI < 30. [Table 2.1]

Baseline ECG shows that 84.4% of patients were in sinus rhythm compared to 86.4% in 2007 – 2012. In 2013 – 2014, patients undergoing PCI with atrial fibrillation was 1.2% (n = 176). [Table 2.1]

In comparison to the NCVD-PCI data, the prevalence of atrial fibrillation in patients admitted to two large Malaysian hospitals were 2.7% and 2.8%^{1,2}. Further epidemiological data collected in Malaysia (PURE-REDISCOVER Study) shows that the prevalence of atrial fibrillation in the population was 0.56%². Interestingly, this is much lower than the 6.2 – 7.9% of patients with atrial fibrillation seen in the GRACE registry³.

Data shown in the NCVD-PCI registry shows the potential scope of problems PCI operators have in dealing with anticoagulation to prevent stroke in patients requiring DAPT. Although the numbers seem small (1.2%), it is a real problem faced daily by interventionalists and patients. [Table 2.1]

Renal function recorded shows a similar profile with patients from 2007 – 2012. Majority (65.3%) of patients undergoing PCI had a glomerular filtration rate GFR (MDRD) that was more than 60 mls/min/1.73m². This is similar with patients studied during the periods of 2007 – 2012. Mean eGFR did not differ much in patients who underwent elective or emergency PCIs. [Table 2.12]

Total cholesterol (TC) and LDL levels were higher in STEMI PCI patients. During the studied period, median TC was 4.1 mmol/l and 5.2 mmol/l in patients with elective PCI and STEMI PCI, respectively. In elective PCI patients, the median LDL was 2.3 mmol/L and for STEMI-PCI, the LDL was 3.2 mmol/L. Depending on the timing of blood sampling for lipid levels in post STEMI patients, the levels will be falsely low. Thus, the difference will likely be even larger. [Table 2.14 and Table 2.15]

The percentage of PCIs performed in patients who presented with an ACS was 35.0% in 2013 – 2014. In 2007 – 2012, the PCIs performed for ACS was 38.7%. Although the percentage decreased, the absolute numbers per year markedly increased. Of the ACS subtypes, STEMI PCI predominates with an increasing trend, from 55.8% in 2007 – 2012 to 57.5% in 2013 – 2014. Of these, 56.2% were anterior STEMIs. [Table 2.1]

A clear trend is seen throughout the period of NCVD-PCI reporting, as there were more PCIs for UA being performed. The ACS PCI cases were 11.2% (n = 1140) during 2007 – 2012 and this increased to 17.4% (n = 946) in 2013 – 2014. This may just represent the higher number of centres reporting to the NCVD-PCI database, but could possibly be proof of adherence to current guidelines that encourage early invasive strategy for patients with unstable angina. [Table 2.1]

The proportion of STEMI PCI in Killip class IV was 6.2% (n = 358) in 2007 – 2012 compared to 14.9% (n = 395) in 2013 – 2014. The doubling of the percentage of patients getting treated for a STEMI with PCI who present with cardiogenic shock may indicate the readiness of interventionalists in the country to attempt emergency revascularisation in high risk patients. [Table 2.1]

When we compare the data for STEMI PCIs with recorded time to treatment between the 2007 – 2012 and 2013 – 2014 periods, the median symptom-to-door time improved from 175 minutes to 87.5 minutes when presenting to a PCI-capable hospital, and 260 minutes to 107 minutes when presenting to a non-PCI-capable hospital. [Table 2.2.1 and Table 2.2.2] The improvement in these times is encouraging, and could be a reflection of improved awareness of the public and successful health promotion.

An area which also showed improvement was the median door-to-balloon (D2B) time for patients presenting to a PCI-capable hospital. During the 2007 – 2012 period, it was 104 minutes, and this improved to 73 minutes during the 2013 – 2014 period. [Table 2.2.2]

For STEMI patients transferred from a non-PCI-capable hospital, the median transfer time markedly improved from 201 minutes to 65 minutes between the two studied cohorts (2007 – 2012 vs. 2013 – 2014); and between these study periods, the median D2B time in these patients also improved from 74 minutes to 62 minutes. [Table 2.2.1]

In all STEMI PCIs (non-transfer and transfer), the median D2B time was 70 minutes. Compared to the median D2B time of 90 minutes during the 2007 – 2012 periods, this was a tremendous improvement in our reported data. It must be noted, however, that the STEMI-PCI numbers during this earlier period was low, and missing data was not insignificant. [Table 2.1]

The improved quality indicator times were encouraging; however more work need to be done to obtain further outcome benefit for STEMI patients treated with primary PCI. With the MySTEMI network initiative (collaboration between PCI capable centres and non-PCI capable centres for patients presenting with STEMI) commenced in 2016, further improvements are expected.

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Table 2.1 Patient clinical status at the time of PCI procedure, NCD-PCI Registry, 2007 – 2014

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 26483		Total no. of procedures = 6928		Total no. of procedures = 8586		Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Clinical examination								
Heart rate at presentation, beats/minute								
N	24115		5975		7642		13617	
Mean (SD)	71.3 (15.9)		74.3 (17.6)		75.1 (18.1)		74.8 (17.9)	
Median (min, max)	69.0 (25.0, 193.0)		72.0 (26.0, 191.0)		72.0 (25.0, 194.0)		72.0 (25.0, 194.0)	
Missing, No. (%)	2368	9.0	953	13.8	944	11.0	1897	12.2
Heart rate at presentation, beats/minute, No. (%)								
< 90	21282	80.4	5058	73.0	6376	74.2	11434	73.8
≥ 90	2833	10.6	917	13.2	1266	14.8	2183	14.0
Missing	2368	9.0	953	13.8	944	11.0	1897	12.2
Systolic blood pressure, mmHg								
N	23837		5873		7529		13402	
Mean (SD)	136.4 (25.2)		135.1 (25.5)		138.0 (26.1)		136.7 (25.9)	
Median (min, max)	134.0 (60.0, 230.0)		133.0 (60.0, 230.0)		136.0 (60.0, 227.0)		135.0 (60.0, 230.0)	
Missing, No. (%)	2646	10.0	1055	15.2	1057	12.4	2112	13.6
Systolic blood pressure, mmHg, No. (%)								
< 90	261	1.0	130	1.9	159	1.8	289	1.8
≥ 90	23576	89.0	5743	82.9	7370	85.8	13113	84.6
Missing	2646	10.0	1055	15.2	1057	12.4	2112	13.6
Diastolic blood pressure, mmHg								
N	23798		5865		7513		13378	
Mean (SD)	76.3 (12.8)		75.8 (13.5)		77.1 (13.7)		76.5 (13.6)	
Median (min, max)	76.0 (10.0, 120.0)		76.0 (10.0, 120.0)		78.0 (11.0, 120.0)		77.0 (10.0, 120.0)	
Missing, No. (%)	2685	10.2	1063	15.4	1073	12.4	2136	13.8
TIMI risk index (TRI)								
N	23542		5813		7410		13223	
Mean (SD)	18.1 (8.1)		19.4 (9.3)		19.3 (9.3)		19.4 (9.3)	
Median (min, max)	16.6 (2.1, 105.2)		17.5 (3.1, 97.0)		17.5 (2.7, 142.7)		17.5 (2.7, 142.7)	
Missing, No. (%)	2941	11.2	1115	16.0	1176	13.6	2291	14.8

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 26483		Total no. of procedures = 6928		Total no. of procedures = 8586		Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
TRI classification, No. (%)								
Low (< 30)	21779	82.2	5187	74.9	6615	77.1	11802	76.0
Intermediate (30 – 70)	1742	6.6	614	8.9	777	9.1	1391	9.0
High (> 70)	21	0.0	12	0.2	18	0.2	30	0.2
Missing	2941	11.2	1115	16.0	1176	13.6	2291	14.8
Baseline ECG, No. (%)								
Sinus rhythm	22907	86.4	5621	81.2	7467	87.0	13088	84.4
Atrial fibrillation	256	1.0	90	1.2	86	1.0	176	1.2
2 nd /3 rd AVB	111	0.4	20	0.2	23	0.2	43	0.2
LBBB	107	0.4	28	0.4	31	0.4	59	0.4
RBBB	155	0.6	22	0.4	17	0.2	39	0.2
HbA1c, %								
N			527		2349		2876	
Mean (SD)			7.8 (2.9)		7.4 (2.4)		7.4 (2.5)	
Median (min, max)			7.0 (4.0, 32.0)		6.7 (4.0, 32.0)		6.7 (4.0, 32.0)	
Missing, No. (%)			6401	92.4	6237	72.6	12638	81.4
NYHA, No. (%)								
<i>Total no. of procedures among patients with heart failure</i>	969	100	251	100	402	100	653	100
NYHA I	306	31.6	106	42.1	201	50.1	307	47.1
NYHA II	463	47.8	81	32.3	131	32.6	212	32.5
NYHA III	130	13.4	24	9.6	35	8.7	59	9.0
NYHA IV	35	3.6	13	5.2	21	5.2	34	5.2
Not available	33	3.4	22	8.8	9	2.2	31	4.7
Missing	2	0.2	5	2.0	5	1.2	10	1.5
Functional ischaemia, No. (%)								
Positive	4684	17.7	645	9.4	520	6.1	1165	7.5
Negative	440	1.6	46	0.6	49	0.7	95	0.5
Equivocal	276	1.0	105	1.6	38	0.4	143	1.0
Not applicable	20716	78.3	3590	51.8	2891	33.6	6481	41.8
Missing	367	1.4	2542	36.6	5088	59.2	7630	49.2

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 26483		Total no. of procedures = 6928		Total no. of procedures = 8586		Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Canadian cardiovascular score (CCS), No. (%)								
CCS 1	7535	28.4	2371	34.2	2758	32.1	5129	33.0
CCS 2	11240	42.4	1437	20.8	2319	26.9	3756	24.2
CCS 3	1340	5.0	286	4.2	440	5.1	726	4.6
CCS 4	800	3.0	528	7.6	473	5.5	1001	6.4
Asymptomatic	3211	12.2	1076	15.6	1305	15.2	2381	15.4
Not available	1688	6.4	560	8.0	576	6.8	1136	7.4
Missing	669	2.6	670	9.6	715	8.4	1385	9.0
*Intra-aortic balloon pump (IABP), No. (%)								
Yes	648	2.4	159	2.2	142	1.7	301	2.0
No	25452	96.2	6035	87.2	8215	95.7	14250	91.8
Not Applicable	0	0	217	3.2	17	0.2	234	1.6
Missing	383	1.4	517	7.4	212	2.4	729	4.6
Acute coronary syndrome (ACS), No. (%)								
Yes	10256	38.7	2356	34.0	3062	35.6	5418	35.0
No	16140	60.9	4572	66.0	5524	64.4	10096	65.0
Missing	87	0.4	0	0	0	0	0	0
ACS type, No. (%)								
STEMI	5722	55.8	1374	58.3	1741	56.8	3115	57.5
NSTEMI	3308	32.2	507	21.5	772	25.2	1279	23.7
UA	1140	11.2	451	19.2	495	16.2	946	17.4
Not available	76	0.8	24	1.0	54	1.8	78	1.4
Missing	10	0.0	0	0	0	0	0	0
STEMI, No. (%)								
Anterior	3137	54.8	765	55.6	984	56.5	1749	56.2
Non-anterior	1916	33.5	499	36.4	667	38.3	1166	37.4
Not available	139	2.5	60	4.4	90	5.2	150	4.8
Missing	530	9.2	50	3.6	0	0	50	1.6

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 26483		Total no. of procedures = 6928		Total no. of procedures = 8586		Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Ejection fraction (EF) status								
N	9630		2343		3127		5470	
Mean (SD)	51.6 (12.7)		51.1 (12.6)		50.5 (12.7)		50.8 (12.6)	
Median (min, max)	53.0 (10.0, 80.0)		53.0 (10.0, 80.0)		51.0 (10.0, 80.0)		52.0 (10.0, 80.0)	
Not available, No. (%)	15604	59.0	3666	53.0	4522	52.6	8188	52.8
Missing, No. (%)	1249	4.8	919	13.2	937	11.0	1856	12.0
Ejection fraction (EF) status, No. (%)								
< 30	423	1.6	119	1.8	160	1.8	279	1.8
30 – < 45	2258	8.6	532	7.6	788	9.2	1320	8.6
45 – < 55	2502	9.3	583	8.4	796	9.2	1379	8.8
≥ 55	4447	16.7	1109	16.0	1383	16.2	2492	16.0
Not available	15604	59.0	3666	53.0	4522	52.6	8188	52.8
Missing	1249	4.8	919	13.2	937	11.0	1856	12.0
Killip class, No. (%)								
<i>Total no. of procedures among patients with PCI STEMI**</i>	5722	100	1231	100	1423	100	2654	100
I	2046	35.9	673	54.7	906	63.7	1579	59.5
II	1937	33.9	160	13.0	162	11.4	322	12.1
III	117	2.0	46	3.7	30	2.1	76	2.9
IV	358	6.2	166	13.5	229	16.1	395	14.9
Not applicable/Not available	1217	21.2	127	10.3	80	5.6	207	7.8
Missing	47	0.8	59	4.8	16	1.1	75	2.8
STEMI: Time-to-treatment analysis[^]								
Symptom-to-door time, minutes								
N	687		100		122		222	
Mean (SD)	270.3 (221.8)		100.6 (44.3)		101.5 (41.4)		101.1 (42.6)	
Median (min, max)	197.0 (10.0, 1350.0)		100.5 (20.0, 176.0)		104.0 (15.0, 173.0)		102.5 (15.0, 176.0)	
Negative/zero, No. (%)	113	2.0	146	37.1	214	43.7	360	40.7
Not available, No. (%)	4922	86.0	148	37.6	154	31.4	302	34.2

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 26483		Total no. of procedures = 6928		Total no. of procedures = 8586		Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Door-to-balloon time, minutes								
N	666		184		254		438	
Mean (SD)	139.6 (149.2)		71.9 (36.5)		78.1 (38.7)		75.5 (37.9)	
Median (min, max)	90.0 (3.0, 963.0)		67.5 (15.0, 171.0)		70.0 (11.0, 178.0)		70.0 (11.0, 178.0)	
Negative/zero, No. (%)	77	1.3	51	12.9	79	16.1	130	14.7
Not available, No. (%)	4979	87.0	159	40.4	157	32.0	316	35.7
Door-to-balloon time, minutes, No. (%)								
< 90	327	5.7	127	32.2	164	33.5	291	32.9
≥ 90	339	5.9	57	14.5	90	18.4	147	16.6
Negative/zero, No. (%)	77	1.3	51	12.9	79	16.1	130	14.8
Not available	4979	87.1	159	40.4	157	32.0	316	35.7
*Transfer time								
N	200		37		61		98	
Mean (SD)	257.0 (203.5)		84.2 (39.9)		63.9 (33.4)		71.6 (37.1)	
Median (min, max)	201.5 (15.0, 1260.0)		80.0 (14.0, 171.0)		63.0 (12.0, 165.0)		65.5 (12.0, 171.0)	
Negative/zero, No. (%)	121	2.1	85	21.6	177	36.1	262	29.6
Not available, No. (%)	5401	94.4	272	69.0	252	51.4	524	59.3
Glomerular filtration rate (GFR), MDRD, No. (%)								
< 15	772	2.9	182	2.7	240	2.7	422	2.8
15 – < 30	533	2.0	128	1.9	153	1.8	281	1.8
30 – < 45	1285	4.9	301	4.3	386	4.5	687	4.4
45 – < 60	3453	13.0	764	11.0	926	10.8	1690	10.9
≥ 60	18079	68.3	4491	64.8	5647	65.8	10138	65.3
Missing	2361	8.9	1062	15.3	1234	14.4	2296	14.8

*IABP was listed in separate sections in the previous and new CRFs. In the old CRF, it was reported in Section 6 (cath lab visit) and in the new CRF, it was reported in Section 7 (PCI procedure details)

**The definition of STEMI is different in the 2007 – 2012 and 2013 – 2014 results. In the 2007 – 2009 results, the patient's clinical status was presented for patients with ACS STEMI (Section 5, no. 4) In 2013 – 2014, it was presented for PCI STEMI patients (Section 6, no. 2)

^Results were presented differently in 2007 – 2012 and 2013 – 2014

In 2007 – 2012, it was presented for ACS STEMI patients

In 2013 – 2014, it was presented for PCI STEMI patients with primary PCI

Table 2.2.1 Time to treatment for STEMI, with transfer, NCVD-PCI Registry, 2007 – 2014[^]

Year	With transfer			
	2007 – 2012	2013	2014	2013 – 2014
	Total no. of procedures = 26483	Total no. of procedures = 6928	Total no. of procedures = 8586	Total no. of procedures = 15514
Symptom-to-door time (minutes)				
N	256	44	75	119
Mean (SD)	325.3 (242.5)	112.1 (39.4)	101.2 (40.0)	105.2 (39.9)
Median (min, max)	263.5 (13.0, 1350.0)	110.5 (35.0, 176.0)	105 (15.0, 171.0)	107 (15.0, 176.0)
N for negative/zero time	49	76	159	235
Door-to-balloon time (minutes)				
N	240	86	166	252
Mean (SD)	137.0 (178.4)	61.8 (36.0)	76.5 (41.5)	71.5 (40.2)
Median (min, max)	74 (5.0, 963.0)	59.0 (15.0, 160.0)	65.5 (11.0, 178.0)	61.5 (11.0, 178.0)
N for negative/zero time	31	28	62	90
Transfer-to-PCI centre time (minutes)				
N	200	37	61	98
Mean (SD)	257 (203.5)	84.2 (39.9)	63.9 (33.4)	71.6 (37.1)
Median (min, max)	201.5 (15.0, 1260.0)	80.0 (14.0, 171.0)	63.0 (12.0, 165.0)	65.5 (12.0, 171.0)
N for negative/zero time	121	85	177	262
Symptom-to-balloon time (minutes)				
N	236	16	35	51
Mean (SD)	406.4 (262.2)	117.4 (43.6)	117.3 (39.9)	117.4 (40.7)
Median (min, max)	353.0 (41.0, 1412.0)	120.0 (24.0, 178.0)	127 (20.0, 169.0)	122.0 (20.0, 178.0)
N for negative/zero time	59	100	198	298

[^]Results were presented differently in 2007 – 2012 and 2013 – 2014

In 2007 – 2012, it was presented for ACS STEMI patients

In 2013 – 2014, it was presented for PCI STEMI patients with primary PCI

Table 2.2.2 Time to treatment for STEMI, without transfer, NCVI-PCI Registry, 2007 – 2014[^]

Year	Without transfer			
	2007 – 2012	2013	2014	2013 – 2014
	Total no. of procedures = 26483	Total no. of procedures = 6928	Total no. of procedures = 8586	Total no. of procedures = 15514
Symptom-to-door time (minutes)				
N	357	41	35	76
Mean (SD)	243.1 (207.6)	91.7 (43.9)	98.1 (45.4)	94.7 (44.4)
Median (min, max)	175.0 (10.0, 1070.0)	80.0 (28.0, 175.0)	95.0 (23.0, 173.0)	87.5 (23.0, 175.0)
N for negative/zero time	52	55	41	96
Door-to-balloon time (minutes)				
N	349	79	64	143
Mean (SD)	144.2 (127.0)	81.9 (35.6)	80.1 (31.9)	81.1 (33.9)
Median (min, max)	104.0 (3.0, 870.0)	74 (15.0, 171.0)	72.0 (28.0, 172.0)	73.0 (15.0, 172.0)
N for negative/zero time	39	15	9	24
Symptom-to-balloon time (minutes)				
N	319	27	19	46
Mean (SD)	358.2 (218.4)	109.1 (41.9)	121.8 (36.7)	114.3 (40.0)
Median (min, max)	300.0 (2.0, 1175.0)	113 (11.0, 178.0)	130.0 (37.0, 166.0)	118.5 (11.0, 178.0)
N for negative/zero time	63	64	58	122

[^]Results were presented differently in 2007 – 2012 and 2013 – 2014

In 2007 – 2012, it was presented for ACS STEMI patients

In 2013 – 2014, it was presented for PCI STEMI patients with primary PCI

Table 2.3 Comparison of heart rate according to PCI status, NCVD-PCI Registry, 2007 – 2014

Year	Heart rate (beats/min)	Elective		NSTEMI/UA		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	< 60	4629	20.0	186	13.4	156	7.8	7	28.0	2	11.8
	60 – 80	12582	54.6	692	49.6	681	34.0	12	48.0	8	47.0
	> 80 – 100	3216	14.0	297	21.2	543	27.0	5	20.0	1	5.9
	> 100	646	2.8	82	5.8	369	18.4	0	0	1	5.9
	Missing	1966	8.6	140	10.0	256	12.8	1	4.0	5	29.4
	Total	23039	100.0	1397	100.0	2005	100.0	25	100.0	17	100.0
2013 Total no. of procedures = 6928	< 60	841	16.5	84	13.4	76	6.2	0	0	0	0
	60 – 80	2555	50.3	297	47.6	422	34.2	0	0	0	0
	> 80 – 100	808	16.0	133	21.2	375	30.4	0	0	0	0
	> 100	159	3.2	36	5.8	189	15.4	0	0	0	0
	Missing	709	14.0	75	12.0	169	13.8	0	0	0	0
	Total	5072	100.0	625	100.0	1231	100.0	0	0	0	0
2014 Total no. of procedures = 8586	< 60	981	15.2	66	8.9	122	8.6	0	0	0	0
	60 – 80	3324	51.8	380	50.9	502	35.2	0	0	0	0
	> 80 – 100	1139	17.8	193	25.8	419	29.4	0	0	0	0
	> 100	225	3.6	53	7.0	238	16.8	0	0	0	0
	Missing	747	11.6	55	7.4	142	10.0	0	0	0	0
	Total	6416	100.0	747	100.0	1423	100.0	0	0	0	0
2013 – 2014 Total no. of procedures = 15514	< 60	1822	15.8	150	11.0	198	7.4	0	0	0	0
	60 – 80	5879	51.2	677	49.4	924	34.8	0	0	0	0
	> 80 – 100	1947	17.0	326	23.8	794	30.0	0	0	0	0
	> 100	384	3.4	89	6.4	427	16.0	0	0	0	0
	Missing	1456	12.6	130	9.4	311	11.8	0	0	0	0
	Total	11488	100.0	1372	100.0	2654	100.0	0	0	0	0

Table 2.4 Comparison of heart rate according to ACS subtypes, NCVD-PCI Registry, 2007 – 2014

Year	Heart rate (beats/min)	STEMI		NSTEMI		UA		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	< 60	827	14.4	636	19.2	207	18.1	8	10.6	2	20.0
	60 – 80	2793	48.8	1778	53.7	581	51.0	26	34.2	5	50.0
	> 80 – 100	1167	20.4	586	17.7	170	15.0	9	11.8	3	30.0
	> 100	496	8.7	151	4.6	40	3.6	2	2.6	0	0
	Missing	439	7.7	157	4.8	142	12.3	31	40.8	0	0
	Total	5722	100.0	3308	100.0	1140	100.0	76	100.0	10	100.0
2013 Total no. of procedures = 6928	< 60	97	7.0	66	12.9	66	14.5	5	20.8	0	0
	60 – 80	486	35.4	244	48.1	217	48.1	11	45.8	0	0
	> 80 – 100	404	29.4	97	19.2	97	21.6	4	16.6	0	0
	> 100	200	14.6	33	6.6	15	3.4	2	8.4	0	0
	Missing	187	13.6	67	13.2	56	12.4	2	8.4	0	0
	Total	1374	100.0	507	100.0	451	100.0	24	100.0	0	0
2014 Total no. of procedures = 8586	< 60	170	9.8	79	10.3	65	13.1	4	7.3	0	0
	60 – 80	669	38.4	403	52.3	254	51.3	22	40.7	0	0
	> 80 – 100	473	27.2	186	24.0	98	19.8	15	27.8	0	0
	> 100	244	14.0	44	5.6	16	3.2	2	3.8	0	0
	Missing	185	10.6	60	7.8	62	12.6	11	20.4	0	0
	Total	1741	100.0	772	100.0	495	100.0	54	100.0	0	0
2013 – 2014 Total no. of procedures = 15514	< 60	267	8.6	145	11.3	131	13.9	9	11.5	0	0
	60 – 80	1155	37.0	647	50.5	471	49.9	33	42.3	0	0
	> 80 – 100	877	28.2	283	22.2	195	20.6	19	24.4	0	0
	> 100	444	14.2	77	6.0	31	3.2	4	5.2	0	0
	Missing	372	12.0	127	10.0	118	12.4	13	16.6	0	0
	Total	3115	100.0	1279	100.0	946	100.0	78	100.0	0	0

Table 2.5 Comparison of systolic blood pressure according to PCI status, NCVD-PCI Registry, 2007 – 2014

Year	Systolic BP (mmHg)	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	< 90	121	0.5	30	2.2	110	5.4	0	0	0	0
	≥ 90	20737	90.0	1203	86.1	1599	79.8	25	100	12	70.6
	Missing	2181	9.5	164	11.7	296	14.8	0	0	5	29.4
	Total	23039	100.0	1397	100.0	2005	100.0	25	100.0	17	100.0
2013 Total no. of procedures = 6928	< 90	41	0.8	12	1.9	77	6.3	0	0	0	0
	≥ 90	4245	83.7	535	85.6	963	78.2	0	0	0	0
	Missing	786	15.5	78	12.5	191	15.5	0	0	0	0
	Total	5072	100.0	625	100.0	1231	100.0	0	0	0	0
2014 Total no. of procedures = 8586	< 90	47	0.7	19	2.6	93	6.5	0	0	0	0
	≥ 90	5530	86.2	665	89.0	1175	82.6	0	0	0	0
	Missing	839	13.1	63	8.4	155	10.9	0	0	0	0
	Total	6416	100.0	747	100.0	1423	100.0	0	0	0	0
2013 – 2014 Total no. of procedures = 15514	< 90	88	0.8	31	2.2	170	6.4	0	0	0	0
	≥ 90	9775	85.1	1200	87.5	2138	80.6	0	0	0	0
	Missing	1625	14.1	141	10.3	346	13.0	0	0	0	0
	Total	11488	100.0	1372	100.0	2654	100.0	0	0	0	0

Table 2.6 Comparison of arterial blood pressure according to PCI status, NCVd-PCI Registry, 2007 – 2014

Year	Arterial blood pressure, mmHg	Elective	NSSTEMI	STEMI	Not available	Missing
2007 – 2012 Total no. of procedures = 26483	N	20789	1230	1695	25	12
	Mean (SD)	96.8 (14.3)	94.1 (15.4)	91.7 (18.0)	97.6 (15.7)	103.5 (14.2)
	Median (min, max)	96.3 (44.0, 155.0)	93.3 (48.7, 148.7)	91.7 (39.0, 150.0)	101.0 (71.3, 124.7)	104.3 (77.3, 127.3)
	Missing, No. (%)	2250 (9.8)	167 (12.0)	310 (15.5)	0 (0)	5 (29.4)
2013 Total no. of procedures = 6928	N	4275	544	1035	0	0
	Mean (SD)	96.9 (14.4)	94.3 (14.6)	90.4 (17.4)	N/A	N/A
	Median (min, max)	96.7 (36.0, 146.7)	94.3 (53.7, 142.3)	90.3 (33.3, 150.0)	N/A	N/A
	Missing, No. (%)	797 (15.7)	81 (13.0)	196 (15.9)	0 (0)	0 (0)
2014 Total no. of procedures = 8586	N	5554	684	1259	0	0
	Mean (SD)	98.5 (14.7)	96.2 (16.1)	93.2 (17.7)	N/A	N/A
	Median (min, max)	97.7 (44.0, 152.7)	95.5 (35.7, 150.0)	93.0 (34.0, 143.3)	N/A	N/A
	Missing, No. (%)	862 (13.4)	63 (8.4)	164 (11.5)	0 (0)	0 (0)
2013 – 2014 Total no. of procedures = 15514	N	9829	1228	2294	0	0
	Mean (SD)	97.8 (14.6)	95.3 (15.5)	91.9 (17.6)	N/A	N/A
	Median (min, max)	97.0 (36.0, 152.7)	95.2 (35.7, 150.0)	91.7 (33.3, 150.0)	N/A	N/A
	Missing, No. (%)	1659 (14.4)	144 (10.5)	360 (13.6)	0 (0)	0 (0)

Table 2.7 Comparison of TIMI risk index according to PCI status, NCVI-PCI Registry, 2007 – 2014

Year	TIMI Risk Index	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	Low (< 30)	19370	84.1	1063	76.1	1313	65.5	21	84.0	12	70.6
	Intermediate (30 – 70)	1229	5.3	150	10.7	360	18.0	3	12.0	0	0
	High (> 70)	2	0.0	7	0.5	12	0.5	0	0	0	0
	Missing	2438	10.6	177	12.7	320	16.0	1	4.0	5	29.4
	Total	23039	100.0	1397	100.0	2005	100.0	25	100.0	17	100.0
2013 Total no. of procedures = 6928	Low (< 30)	3913	77.2	460	73.6	814	66.2	0	0	0	0
	Intermediate (30 – 70)	328	6.5	78	12.5	208	16.9	0	0	0	0
	High (> 70)	2	0	2	0.3	8	0.6	0	0	0	0
	Missing	829	16.3	85	13.6	201	16.3	0	0	0	0
	Total	5072	100.0	625	100.0	1231	100.0	0	0	0	0
2014 Total no. of procedures = 8586	Low (< 30)	5035	78.5	567	75.9	1013	71.2	0	0	0	0
	Intermediate (30 – 70)	455	7.1	100	13.4	222	15.6	0	0	0	0
	High (> 70)	1	0	5	0.7	12	0.8	0	0	0	0
	Missing	925	14.4	75	10.0	176	12.4	0	0	0	0
	Total	6416	100.0	747	100.0	1423	100.0	0	0	0	0
2013 – 2014 Total no. of procedures = 15514	Low (< 30)	8948	77.9	1027	74.8	1827	68.8	0	0	0	0
	Intermediate (30 – 70)	783	6.8	178	13.0	430	16.2	0	0	0	0
	High (> 70)	3	0	7	0.5	20	0.8	0	0	0	0
	Missing	1754	15.3	160	11.7	377	14.2	0	0	0	0
	Total	11488	100.0	1372	100.0	2654	100.0	0	0	0	0

Table 2.8 Comparison of ejection fraction according to PCI status, NCVD-PCI Registry, 2007 – 2014

Year	Ejection fraction (EF)	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	< 30	360	1.6	25	1.8	38	1.9	0	0	0	0
	30 – < 45	1906	8.3	120	8.6	232	11.6	0	0	0	0
	45 – < 55	2139	9.3	132	9.4	226	11.3	4	16.0	1	5.9
	≥ 55	4174	18.1	158	11.3	111	5.5	3	12.0	1	5.9
	Not available	13449	58.3	869	62.2	1265	63.1	18	72.0	3	17.6
	Missing	1011	4.4	93	6.7	133	6.6	0	0	12	70.6
	Total	23039	100.0	1397	100.0	2005	100.0	25	100.0	17	100.0
2013 Total no. of procedures = 6928	< 30	94	1.8	15	2.4	10	0.9	0	0	0	0
	30 – < 45	368	7.3	56	9.0	108	8.8	0	0	0	0
	45 – < 55	437	8.6	52	8.3	94	7.6	0	0	0	0
	≥ 55	963	19.0	94	15.0	52	4.2	0	0	0	0
	Not available	2516	49.6	331	53.0	819	66.5	0	0	0	0
	Missing	694	13.7	77	12.3	148	12.0	0	0	0	0
	Total	5072	100.0	625	100.0	1231	100.0	0	0	0	0
2014 Total no. of procedures = 8586	< 30	127	2.0	11	1.5	22	1.6	0	0	0	0
	30 – < 45	596	9.3	59	7.9	133	9.3	0	0	0	0
	45 – < 55	621	9.7	60	8.0	115	8.1	0	0	0	0
	≥ 55	1215	18.9	108	14.5	60	4.2	0	0	0	0
	Not available	3153	49.1	432	57.8	937	65.8	0	0	0	0
	Missing	704	11.0	77	10.3	156	11.0	0	0	0	0
	Total	6416	100.0	747	100.0	1423	100.0	0	0	0	0
2013 – 2014 Total no. of procedures = 15514	< 30	221	1.9	26	1.9	32	1.2	0	0	0	0
	30 – < 45	964	8.4	115	8.4	241	9.1	0	0	0	0
	45 – < 55	1058	9.2	112	8.2	209	7.8	0	0	0	0
	≥ 55	2178	19.0	202	14.7	112	4.2	0	0	0	0
	Not available	5669	49.3	763	55.6	1756	66.2	0	0	0	0
	Missing	1398	12.2	154	11.2	304	11.5	0	0	0	0
	Total	11488	100.0	1372	100.0	2654	100.0	0	0	0	0

Table 2.9 Comparison of NYHA according to PCI status among patients with heart failure, NCVD-PCI Registry, 2007 – 2014

Year	NYHA classification	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	NYHA I	277	33.3	14	17.5	14	24.6	1	100	0	0
	NYHA II	413	49.7	35	43.8	15	26.2	0	0	0	0
	NYHA III	100	12.0	18	22.5	12	21.2	0	0	0	0
	NYHA IV	11	1.3	9	11.3	15	26.2	0	0	0	0
	Not available	29	3.5	3	3.8	1	1.8	0	0	0	0
	Missing	1	0.2	1	1.1	0	0	0	0	0	0
	Total	831	100.0	80	100.0	57	100.0	1	100.0	0	0
2013 Total no. of procedures = 6928	NYHA I	86	45.0	14	35.0	6	30.0	0	0	0	0
	NYHA II	64	33.5	15	37.5	2	10.0	0	0	0	0
	NYHA III	16	8.4	6	15.0	2	10.0	0	0	0	0
	NYHA IV	4	2.1	3	7.5	6	30.0	0	0	0	0
	Not available	17	8.9	1	2.5	4	20.0	0	0	0	0
	Missing	4	2.1	1	2.5	0	0	0	0	0	0
	Total	191	100.0	40	100.0	20	100.0	0	0	0	0
2014 Total no. of procedures = 8586	NYHA I	173	54.9	14	32.6	14	31.9	0	0	0	0
	NYHA II	109	34.7	16	37.2	6	13.6	0	0	0	0
	NYHA III	22	7.0	8	18.6	5	11.4	0	0	0	0
	NYHA IV	2	0.6	5	11.6	14	31.8	0	0	0	0
	Not available	7	2.2	0	0	2	4.5	0	0	0	0
	Missing	2	0.6	0	0	3	6.8	0	0	0	0
	Total	315	100.0	43	100.0	44	100.0	0	0	0	0
2013 – 2014 Total no. of procedures = 15514	NYHA I	259	51.2	28	33.8	20	31.2	0	0	0	0
	NYHA II	173	34.2	31	37.3	8	12.5	0	0	0	0
	NYHA III	38	7.5	14	16.9	7	10.9	0	0	0	0
	NYHA IV	6	1.2	8	9.6	20	31.3	0	0	0	0
	Not available	24	4.7	1	1.2	6	9.4	0	0	0	0
	Missing	6	1.2	1	1.2	3	4.7	0	0	0	0
	Total	506	100.0	83	100.0	64	100.0	0	0	0	0

Table 2.10 Comparison of previous PCI according to PCI status, NCVd-PCI Registry, 2007 – 2014

Year	Previous PCI	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	Yes	5561	24.1	284	20.3	169	8.4	5	20.0	2	11.8
	No	17466	75.8	1112	79.6	1836	91.6	20	80.0	9	52.9
	Missing	12	0.1	1	0.1	0	0	0	0	6	35.3
	Total	23039	100.0	1397	100.0	2005	100.0	25	100.0	17	100.0
2013 Total no. of procedures = 6928	Yes	1285	25.3	131	21.0	93	7.6	0	0	0	0
	No	3787	74.7	494	79.0	1138	92.4	0	0	0	0
	Missing	0	0	0	0	0	0	0	0	0	0
	Total	5072	100.0	625	100.0	1231	100.0	0	0	0	0
2014 Total no. of procedures = 8586	Yes	1720	26.8	154	20.6	104	7.3	0	0	0	0
	No	4696	73.2	593	79.4	1319	92.7	0	0	0	0
	Missing	0	0	0	0	0	0	0	0	0	0
	Total	6416	100.0	747	100.0	1423	100.0	0	0	0	0
2013 – 2014 Total no. of procedures = 15514	Yes	3005	26.2	285	20.8	197	7.4	0	0	0	0
	No	8483	73.8	1087	79.2	2457	92.6	0	0	0	0
	Missing	0	0	0	0	0	0	0	0	0	0
	Total	11488	100.0	1372	100.0	2654	100.0	0	0	0	0

Table 2.11 Comparison of HbA1c according to PCI status, NCVd-PCI Registry, 2007 – 2014

Year	HbA1c, mmol/L	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	N	3492		142		139		0		0	
	Mean (SD)	8.2 (16.8)		7.6 (2.1)		10.9 (19.4)		N/A		N/A	
	Median (min, max)	7.0 (0.9, 908.0)		7.2 (4.0, 15.8)		7.3 (2.3, 165.0)		N/A		N/A	
	Missing, No. (%)	19547	84.8	1255	89.8	1866	93.1	25	100.0	17	100.0
2013 Total no. of procedures = 6928	N	434		37		56		0		0	
	Mean (SD)	7.7 (2.8)		7.3 (1.9)		9.0 (3.7)		N/A		N/A	
	Median (min, max)	6.9 (4.0, 32.0)		7.1 (4.2, 12.9)		8.6 (4.4, 27.9)		N/A		N/A	
	Missing, No. (%)	4638	91.4	588	94.1	1175	95.5	0	0	0	0
2014 Total no. of procedures = 8586	N	2056		120		173		0		0	
	Mean (SD)	7.3 (2.3)		7.7 (3.3)		7.4 (3.1)		N/A		N/A	
	Median (min, max)	6.7 (4.0, 30.0)		6.8 (4.7, 31.0)		6.3 (4.5, 32.0)		N/A		N/A	
	Missing, No. (%)	4360	68.0	627	83.9	1250	87.8	0	0	0	0
2013 – 2014 Total no. of procedures = 15514	N	2490		157		229		0		0	
	Mean (SD)	7.4 (2.4)		7.6 (3.0)		7.8 (3.3)		N/A		N/A	
	Median (min, max)	6.7 (4.0, 32.0)		6.9 (4.2, 31.0)		6.5 (4.4, 32.0)		N/A		N/A	
	Missing, No. (%)	8998	78.3	1215	88.6	2425	91.4	0	0	0	0

Table 2.12 Comparison of baseline creatinine according to PCI status, NCVD-PCI Registry, 2007 – 2014

Year	Baseline creatinine, mmol/L	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	N	21371		1211		1503		25		12	
	Mean (SD)	117.5 (125.5)		116.2 (110.5)		111.6 (89.6)		156.0 (169.1)		102.8 (31.1)	
	Median (min, max)	93.0 (44.0, 6500.0)		91.0 (45.0, 1533.0)		92.0 (44.0, 1222.0)		100.0 (60.0, 740.0)		100.0 (54.0, 182.0)	
	Not available, No. (%)	594	2.6	82	5.9	281	14.0	0	0	0	0
	Missing, No. (%)	1074	4.7	104	7.4	221	11.0	0	0	5	29.4
2013 Total no. of procedures = 6928	N	4436		528		902		0		0	
	Mean (SD)	116.2 (118.8)		133.3 (151.7)		105.9 (78.6)		N/A		N/A	
	Median (min, max)	92.0 (44.0, 1466.0)		94.0 (44.0, 1510.0)		93.0 (44.0, 1378.0)		N/A		N/A	
	Not available, No. (%)	246	4.9	36	5.8	147	11.9	0	0	0	0
	Missing, No. (%)	390	7.7	61	9.8	182	14.8	0	0	0	0
2014 Total no. of procedures = 8586	N	5631		653		1068		0		0	
	Mean (SD)	116.2 (116.2)		122.9 (137.6)		111.5 (103.1)		N/A		N/A	
	Median (min, max)	91.0 (44.0, 1632.0)		91.0 (45.0, 1606.0)		92.0 (44.0, 1615.0)		N/A		N/A	
	Not available, No. (%)	420	6.5	52	7	221	15.5	0	0	0	0
	Missing, No. (%)	365	5.7	42	5.6	134	9.4	0	0	0	0
2013 – 2014 Total no. of procedures = 15514	N	10067		1181		1970		0		0	
	Mean (SD)	116.2 (117.3)		127.6 (144.1)		108.9 (92.7)		N/A		N/A	
	Median (min, max)	92.0 (44.0, 1632.0)		92.0 (44.0, 1606.0)		92.0 (44.0, 1615.0)		N/A		N/A	
	Not available, No. (%)	666	5.8	88	6.4	368	13.9	0	0	0	0
	Missing, No. (%)	755	6.6	103	7.5	316	11.9	0	0	0	0

Table 2.13 Comparison of GFR according to PCI status, NCVD-PCI Registry, 2007 – 2014

Year	GFR	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	N	21371		1211		1503		25		12	
	Mean (SD)	73.8 (24.9)		74.0 (26.5)		76.0 (27.9)		65.7 (26.8)		73.2 (19.9)	
	Median (min, max)	74.8 (0.6, 207.4)		76.1 (2.8, 172.1)		76.9 (4.1, 212.5)		71.1 (6.9, 96.5)		70.4 (37.9, 111.1)	
	Missing, No. (%)	1668	7.2	186	13.3	502	25.0	0	0	5	29.4
2013 Total no. of procedures = 6928	N	4436		528		902		0		0	
	Mean (SD)	75.0 (25.2)		71.7 (28.5)		78.1 (26.6)		N/A		N/A	
	Median (min, max)	75.4 (2.9, 179.2)		73.1 (3.4, 177.5)		76.6 (3.6, 177.7)		N/A		N/A	
	Missing, No. (%)	636	12.5	97	15.5	329	26.7	0	0	0	0
2014 Total no. of procedures = 8586	N	5632		653		1068		0		0	
	Mean (SD)	75.1 (25.5)		75.5 (29.2)		77.7 (26.8)		N/A		N/A	
	Median (min, max)	76.1 (0.4, 198.6)		76.2 (3.1, 177.0)		77.9 (2.8, 200.5)		N/A		N/A	
	Missing, No. (%)	784	12.2	94	12.6	355	24.9	0	0	0	0
2013 – 2014 Total no. of procedures = 15514	N	10068		1181		1970		0		0	
	Mean (SD)	75.0 (25.4)		73.8 (29.0)		77.9 (26.7)		N/A		N/A	
	Median (min, max)	75.7 (0.4, 198.6)		74.8 (3.1, 177.5)		77.6 (2.8, 200.5)		N/A		N/A	
	Missing, No. (%)	1420	12.4	191	13.9	684	25.8	0	0	0	0

Table 2.14 Comparison of TC according to PCI status, NCVD-PCI Registry, 2007 – 2014

Year	Total cholesterol mmol/L	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	N	15094		733		867		12		7	
	Mean (SD)	4.5 (1.2)		4.8 (1.5)		5.3 (1.6)		4.8 (1.0)		6.4 (5.2)	
	Median (min, max)	4.3 (2.0, 24.2)		4.7 (2.0, 22.0)		5.2 (2.0, 23.0)		4.9 (3.1, 6.0)		4.9 (3.3, 18.0)	
	Not available, No. (%)	5887	25.6	484	34.6	823	41.0	6	24.0	5	29.4
	Missing, No. (%)	2058	8.9	180	12.9	315	15.7	7	28.0	5	29.4
2013 Total no. of procedures = 6928	N	2900		322		502		0		0	
	Mean (SD)	4.4 (1.2)		4.7 (1.7)		5.2 (1.6)		N/A		N/A	
	Median (min, max)	4.2 (2.0, 10.6)		4.5 (2.1, 25.0)		5.1(2.0, 14.5)		N/A		N/A	
	Not available, No. (%)	1403	27.7	189	30.2	446	36.2	0	0	0	0
	Missing, No. (%)	769	15.2	114	18.2	283	23.0	0	0	0	0
2014 Total no. of procedures = 8586	N	3387		328		585		0		0	
	Mean (SD)	4.4 (1.4)		4.6 (1.3)		5.2 (1.4)		N/A		N/A	
	Median (min, max)	4.1 (2.0, 25.0)		4.4 (2.0, 10.3)		5.1(2.0, 15.0)		N/A		N/A	
	Not available, No. (%)	2121	33.1	300	40.2	569	40.0	0	0	0	0
	Missing, No. (%)	908	14.2	119	15.9	269	18.9	0	0	0	0
2013 – 2014 Total no. of procedures = 15514	N	6287		650		1087		0		0	
	Mean (SD)	4.4 (1.3)		4.7 (1.5)		5.2 (1.5)		N/A		N/A	
	Median (min, max)	4.1 (2.0, 25.0)		4.4 (2.0, 25.0)		5.1 (2.0, 15.0)		N/A		N/A	
	Not available, No. (%)	3524	30.7	489	35.6	1015	38.2	0	0	0	0
	Missing, No. (%)	1677	14.6	233	17.0	552	20.8	0	0	0	0

Table 2.15 Comparison of LDL according to PCI status, NCVD-PCI Registry, 2007 – 2014

Year	LDL cholesterol, mmol/L	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	N	14906		734		826		15		6	
	Mean (SD)	2.6 (1.1)		3.0 (1.3)		3.4 (1.4)		3.9 (4.0)		2.6 (1.0)	
	Median (min, max)	2.4 (0.7, 20.0)		2.8 (0.8, 20.0)		3.3 (0.8, 16.0)		3.1 (1.2, 18.0)		2.8 (0.9, 3.6)	
	Not available, No. (%)	6061	26.3	501	35.9	845	42.1	9	36.0	5	29.4
	Missing, No. (%)	2072	9.0	162	11.6	334	16.7	1	4.0	6	35.3
2013 Total no. of procedures = 6928	N	2801		306		473		0		0	
	Mean (SD)	2.5 (1.1)		2.9 (1.5)		3.4 (1.4)		N/A		N/A	
	Median (min, max)	2.3 (0.8, 20.0)		2.6 (0.8, 18.0)		3.3 (0.9, 12.3)		N/A		N/A	
	Not available, No. (%)	1454	28.7	206	33.0	468	38.0	0	0	0	0
	Missing, No. (%)	817	16.1	113	18.1	290	23.6	0	0	0	0
2014 Total no. of procedures = 8586	N	3308		313		556		0		0	
	Mean (SD)	2.5 (1.1)		2.8 (1.2)		3.4 (1.3)		N/A		N/A	
	Median (min, max)	2.2 (0.8, 16.0)		2.6 (0.8, 8.3)		3.2 (0.8, 13.8)		N/A		N/A	
	Not available, No. (%)	2207	34.4	316	42.3	593	41.7	0	0	0	0
	Missing, No. (%)	901	14.0	118	15.8	274	19.3	0	0	0	0
2013 – 2014 Total no. of procedures = 15514	N	6109		619		1029		0		0	
	Mean (SD)	2.5 (1.1)		2.8 (1.4)		3.4 (1.3)		N/A		N/A	
	Median (min, max)	2.3 (0.8, 20.0)		2.6 (0.8, 18.0)		3.2 (0.8, 13.8)		N/A		N/A	
	Not available, No. (%)	3661	31.9	522	38.0	1061	40.0	0	0	0	0
	Missing, No. (%)	1718	15.0	231	16.8	564	21.3	0	0	0	0

Table 2.16 Comparison of functional ischaemia according to PCI status, NCVD-PCI Registry, 2007 – 2014

Year	Functional ischaemia	Elective		NSTEMI		STEMI		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	Positive	4402	19.1	140	10.0	135	6.7	6	24.0	1	5.9
	Negative	398	1.8	13	0.9	28	1.4	1	4.0	0	0
	Equivocal	251	1.1	11	0.8	13	0.6	0	0	1	5.9
	Not applicable	17705	76.8	1208	86.5	1780	88.9	18	72.0	5	29.4
	Missing	283	1.2	25	1.8	49	2.4	0	0	10	58.8
	Total	23039	100.0	1397	100.0	2005	100.0	25	100.0	17	100.0
2013 Total no. of procedures = 6928	Positive	566	11.2	38	6.1	41	3.3	0	0	0	0
	Negative	32	0.6	8	1.3	6	0.5	0	0	0	0
	Equivocal	77	1.5	15	2.4	13	1.1	0	0	0	0
	Not applicable	2592	51.1	317	50.7	681	55.3	0	0	0	0
	Missing	1805	35.6	247	39.5	490	39.8	0	0	0	0
	Total	5072	100.0	625	100.0	1231	100.0	0	0	0	0
2014 Total no. of procedures = 8586	Positive	484	7.5	25	3.3	11	0.8	0	0	0	0
	Negative	43	0.7	2	0.3	4	0.3	0	0	0	0
	Equivocal	32	0.5	4	0.5	2	0.1	0	0	0	0
	Not applicable	2118	33.0	247	33.1	526	37.0	0	0	0	0
	Missing	3739	58.3	469	62.8	880	61.8	0	0	0	0
	Total	6416	100.0	747	100.0	1423	100.0	0	0	0	0
2013 – 2014 Total no. of procedures = 15514	Positive	1050	9.1	63	4.6	52	1.9	0	0	0	0
	Negative	75	0.7	10	0.7	10	0.4	0	0	0	0
	Equivocal	109	0.9	19	1.4	15	0.6	0	0	0	0
	Not applicable	4710	41.0	564	41.1	1207	45.5	0	0	0	0
	Missing	5544	48.3	716	52.2	1370	51.6	0	0	0	0
	Total	11488	100.0	1372	100.0	2654	100.0	0	0	0	0

Table 2.17 Comparison of ECG according to ACS subtypes, NCVd-PCI Registry, 2007 – 2014

Year	ECG	STEMI		NSTEMI		UA		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 10256	Sinus rhythm	4469	43.6	2802	27.3	953	9.3	46	0.4	10	0.1
	Atrial fibrillation	49	0.5	36	0.4	13	0.1	1	0	0	0
	2 nd /3 rd AVB	65	0.6	7	0.1	5	0.0	0	0	0	0
	LBBB	20	0.2	13	0.1	5	0.0	0	0	0	0
	RBBB	25	0.2	34	0.3	10	0.1	0	0	0	0
2013 Total no. of procedures = 6928	Sinus rhythm	1036	44.0	393	16.7	378	16.0	19	0.8	0	0
	Atrial fibrillation	16	0.7	5	0.2	3	0.1	0	0	0	0
	2 nd /3 rd AVB	11	0.5	6	0.3	1	0	0	0	0	0
	LBBB	9	0.4	3	0.1	1	0	0	0	0	0
	RBBB	7	0.3	3	0.1	2	0.1	0	0	0	0
2014 Total no. of procedures = 8586	Sinus rhythm	1483	48.4	650	21.2	409	13.4	46	1.5	0	0
	Atrial fibrillation	21	0.7	12	0.4	4	0.1	0	0	0	0
	2 nd /3 rd AVB	20	0.7	0	0	1	0	0	0	0	0
	LBBB	14	0.5	3	0.1	3	0.1	0	0	0	0
	RBBB	3	0.1	2	0.1	2	0.1	0	0	0	0
2013 – 2014 Total no. of procedures = 15514	Sinus rhythm	2519	46.5	1043	19.3	787	14.5	65	1.2	0	0
	Atrial fibrillation	37	0.7	17	0.3	7	0.1	0	0	0	0
	2 nd /3 rd AVB	31	0.6	6	0.1	2	0	0	0	0	0
	LBBB	23	0.4	6	0.1	4	0.1	0	0	0	0
	RBBB	10	0.2	5	0.1	4	0.1	0	0	0	0

Table 2.18 Comparison of IABP use according to ACS subtypes, NCVd-PCI Registry, 2007 – 2014

Year	*IABP	STEMI		NSTEMI		UA		Not available		Missing	
		No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 10256	Yes	398	6.9	91	2.8	29	2.5	7	9.2	0	0
	No	5251	91.8	3179	96.1	1089	95.5	63	82.9	9	90.0
	Not applicable										
	Missing	73	1.3	38	1.1	22	2.0	6	7.9	1	10.0
	Total	5722	100.0	3308	100.0	1140	100.0	76	100.0	10	100.0
2013 Total no. of procedures = 6928	Yes	88	6.5	17	3.4	6	1.3	0	0	0	0
	No	1083	78.8	430	84.7	375	83.1	23	95.8	0	0
	Not applicable	54	3.9	17	3.4	17	3.8	0	0	0	0
	Missing	149	10.8	43	8.5	53	11.8	1	4.2	0	0
	Total	1374	100.0	507	100.0	451	100.0	24	100.0	0	0
2014 Total no. of procedures = 8586	Yes	88	5.1	17	2.2	2	0.4	1	1.9	0	0
	No	1580	90.7	719	93.2	469	94.8	35	64.8	0	0
	Not applicable	5	0.3	1	0.1	1	0.2	0	0	0	0
	Missing	68	3.9	35	4.5	23	4.6	18	33.3	0	0
	Total	1741	100.0	772	100.0	495	100.0	54	100.0	0	0
2013 – 2014 Total no. of procedures = 15514	Yes	176	5.7	34	2.7	8	0.8	1	1.3	0	0
	No	2663	85.5	1149	89.8	844	89.2	58	74.3	0	0
	Not applicable	59	1.9	18	1.4	18	1.9	0	0	0	0
	Missing	217	6.9	78	6.1	76	8.1	19	24.4	0	0
	Total	3115	100.0	1279	100.0	946	100.0	78	100.0	0	0

*IABP was listed in separate sections in the previous and new CRFs. In the old CRF, it was reported in Section 6 (cath lab visit), and in the new CRF, it was reported in Section 7 (PCI procedure details)

PROCEDURAL SETTINGS

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Summary

1. Majority of PCIs performed in Malaysia from 2013 – 2014 were performed as elective cases (n = 11,488, 74.1%). The number of PCI procedures had increased over the years; and there had been an increasing trend of PCI performed in the setting of acute coronary syndrome (STEMI/NSTEMI/UA).
2. Radial access (57%) had become the preferred percutaneous entry in the year 2013 – 2014.
3. The use of closure device had increased in 2013 – 2014 (13%) compared to only 3.9% in the year 2007–2012.
4. Aspirin and clopidogrel remained the two most common antiplatelet therapies for patients undergoing coronary angioplasty.
5. The overall use of clopidogrel had decreased in 2013 – 2014, with the introduction of newer antiplatelet agents such as ticagrelor.

This chapter discusses the procedural details and treatment received by patients who underwent PCI from 2013 to 2014.

A total of 15,514 PCI procedures were performed during this two year period in 15 centres across Malaysia. The total number of procedures reported steadily increased over the years; with an average of 4,413/year during 2007 – 2012 to 6,928 and 8,586 in 2013 and 2014, respectively. [Table 3.1]

Most of the PCIs were performed as elective cases (n = 11,488, 74.1%). About 17.1% (n = 2,654) of the total procedures were performed for acute ST-elevation myocardial infarction (STEMI) and 8.8% (n = 1,372) were for non-ST-elevation myocardial infarction/unstable angina (NSTEMI/UA). [Table 3.1]

There were decreases in the percentage of elective cases from 90.1% in 2007 – 2009 to 84.6% in 2010 – 2012 and 74.1% in 2013 – 2014. There was an increase in the number of PCIs performed during index admission with acute coronary syndrome (STEMI/NSTEMI/UA) for the year 2013 – 2014 (n = 3,397, 12.8%) compared to 2007 – 2012 registry (n = 4,026, 25.9%). [Table 3.1]

In the cohort of STEMI PCI (n = 2,654), nearly one-third was performed as primary PCI (n = 884, 33.3%), while another third was treated in the rescue PCI setting (n = 844, 31.8%). [Table 3.1]

Procedural access, guiding size and closure

Based on the previous registry (2007–2012), the preferred percutaneous entry of PCI was femoral artery access (52.3%). However, during 2013 – 2014, femoral access had decreased to 45.9% while radial percutaneous entry became the preferred choice (54.3% in 2013 and 59.2% in 2014). The most common size of guiding catheter was 6Fr (91.8%) followed by 7Fr (7.4%). [Table 3.1]

Majority of post procedural access closure was by manual compression (80.8% in 2013 – 2014). However, there was an increased in the use of closure devices from 3.9% (2007 to 2012) to 13.0% (2013 – 2014). [Table 3.1]

Extent of coronary diseases

About two-thirds of patients who went for PCI in this cohort had single vessel disease (64.4% in 2013 – 2014 vs. 46.1% in 2007 – 2012). [Table 3.1]

Only 2.9% (n = 470) of patients had left main stem involvement, however this was higher in 2013 – 2014 than in 2007 – 2012 (n = 171). [Table 3.1]

Coronary angioplasty was done in 1.3% (n = 198) of patients who have had bypass grafts . [Table 3.1]

PCI procedure

The mean fluoroscopy time was 19.3 minutes (SD 16.7), the median was 14.5 minutes. The values were similar to values in 2007 – 2012. [Table 3.1]

In terms of contrast volume, the mean for 2013 – 2014 was 162.8 ml (SD 68.9 ml) and the median was 150 ml. The mean and median contrast volume were comparable to the previous registry in 2007 – 2012 which had a mean of 177.2 ml (SD 68.9) and median of 150.0 ml. [Table 3.1]

Treatment of patients undergoing PCI

GP IIb/IIIa blocker.

Overall, the use of GP IIb/IIIa blocker remained low; even lower compared to the previous cohort (3.8% in 2013 – 2014 and 4.8% in 2007 – 2012).

Intravenous unfractionated heparin infusion and low molecular weight heparin (LMWH)

Intravenous unfractionated heparin remained the choice of anticoagulant used during PCI, which was 95.2% between 2007 – 2012 and 95.6% between 2013 – 2014. [Table 3.1]

Anti-platelets

Aspirin and clopidogrel were the two most common antiplatelet agents used in PCI in 2013 – 2014. The majority of patients received aspirin during PCI (98.9% in 2013 – 2014 and 98.6% in 2007 – 2012). [Table 3.1]

There was a decrease in clopidogrel use from 97.9% in 2007 – 2012 to 90.8% in 2013 – 2014. This was reflected in the increased use of other newer antiplatelet agents such as ticagrelor (10.5% of the patients in 2013 – 2014 and 0% in 2007–2012). [Table 3.1]

There was an increasing trend of clopidogrel use for 12 months, 55.2% in 2007 – 2012 to 76.3% in 2013 – 2014. [Table 3.1] The increase in the duration of antiplatelet therapies could possibly reflect the higher use of drug-eluting stents in 2013 – 2014. [Table 3.2]

Table 3.1 PCI status of patients who underwent procedures, NCVD-PCI Registry, 2007 – 2014

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 26483		Total no. of procedures = 6928		Total no. of procedures = 8586		Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
PCI status, No. (%)								
Elective	23039	87.0	5072	73.2	6416	74.7	11488	74.1
NSTEMI/UA	1397	5.3	625	9.0	747	8.7	1372	8.8
STEMI	2005	7.5	1231	17.8	1423	16.6	2654	17.1
Not available	25	0.1	0	0	0	0	0	0
Missing	17	0.1	0	0	0	0	0	0
Elective, No. (%)	23039	87.0	5072	73.2	6416	74.7	11488	74.1
Staged PCI	5111	24.2	1442	20.8	2009	23.4	3451	22.2
Ad hoc	16046	75.8	3594	51.9	4362	50.8	7956	51.3
NSTEMI/UA, No. (%)	1397	5.3	625	9.0	747	8.7	1372	8.8
Urgent	824.0	60.1	218	34.9	228	30.5	446	32.5
Non-urgent	548.0	39.9	401	64.2	511	68.4	912	66.5
STEMI, No. (%)	2005	7.5	1231	17.8	1423	16.6	2654	17.1
Rescue	737	37.1	410	33.3	434	30.5	844	31.8
Primary	762	38.3	394	32.0	490	34.4	884	33.3
Facilitated	26	1.3	25	2.0	43	3.0	68	2.6
Delayed PCI	464	23.3	67	5.4	0	0	67	2.5
Delayed routine PCI			162	13.2	218	15.3	380	14.3
Delayed selective PCI			110	8.9	136	9.6	246	9.3
Pharmacoinvasive			38	3.1	93	6.5	131	4.9
#Percutaneous entry, No. (%)								
Brachial	183	0.7	67	1.0	47	0.5	114	0.7
Radial	11301	42.7	3763	54.3	5083	59.2	8846	57.0
Femoral	13857	52.3	3221	46.5	3899	45.4	7120	45.9
^s French size type, No. (%)								
Guiding catheter			8229	96.7	10518	97.3	18747	97.0
Guiding sheath			149	1.7	273	2.5	422	2.2
Not available			42	0.5	20	0.2	62	0.3
Missing			97	1.1	1	0.0	98	0.5

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 26483		Total no. of procedures = 6928		Total no. of procedures = 8586		Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
^French size (guiding catheter), No. (%)								
4			27	0.4	8	0.1	35	0.2
5	249	0.9	20	0.2	15	0.1	35	0.2
6	21667	81.8	7405	90.0	9822	93.5	17227	91.8
7	3441	13.0	728	8.8	654	6.2	1382	7.4
8	155	0.6	16	0.2	5	0.0	21	0.1
*9	2	0.0	0	0	1	0.0	1	0.0
Others	9	0.0	0	0	11	0.1	11	0.1
Not available	330	1.3	33	0.4	2	0.0	35	0.2
Missing	630	2.4	0	0	0	0	0	0
^French size (guiding sheath), No. (%)								
4			0	0	0	0	0	0
5			0	0	0	0	0	0
6			129	86.5	245	89.8	374	88.6
7			0	0	0	0	0	0
8			19	12.8	26	9.5	45	10.7
*9			1	0.7	2	0.7	3	0.7
Others			0	0	0	0	0	0
Not available			0	0	0	0	0	0
Missing			0	0	0	0	0	0
Closure device, No. (%)								
No	23702	89.5	5984	86.3	6547	76.3	12531	80.8
Seal	512	1.9	157	2.3	226	2.6	383	2.5
Suture	494	1.9	245	3.5	715	8.3	960	6.2
Exoseal			52	0.8	93	1.1	145	0.9
Others	39	0.1	80	1.2	454	5.3	534	3.4
Not available	380	1.4	89	1.3	61	0.7	150	1.0
Missing	1356	5.2	321	4.6	490	5.7	811	5.2
#^Extent of coronary disease, No. (%)								
Single vessel disease	12198	46.1	4109	59.3	5875	68.4	9984	64.4
Multiple vessel disease	12322	46.5	2382	34.4	2329	27.1	4711	30.4
Left main/LMS	171	0.6	200	2.9	270	3.1	470	2.9
Graft	292	1.1	90	1.3	108	1.3	198	1.3
Not available			147	2.1	4	0.1	151	1.0

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 26483		Total no. of procedures = 6928		Total no. of procedures = 8586		Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Fluoroscopy time, min								
N	22773		5930		7558		13488	
Mean (SD)	20.4 (18.3)		19.2 (17.1)		19.3 (16.3)		19.3 (16.7)	
Median (min, max)	15.3 (2.0, 180.0)		14.4 (2.0, 171.0)		14.5 (2.0, 175.0)		14.5 (2.0, 175.0)	
Not available, No. (%)	2222	8.4	595	8.6	670	7.8	1265	8.2
Missing, No. (%)	1488	5.6	403	5.8	358	4.2	761	4.9
Fluoroscopy total dose, mGy								
N	11527		3113		4616		7729	
Mean (SD)	3316.3 (26882.6)		71682.5 (1635133.5)		55394.0 (408095.8)		61954.5 (1084518.4)	
Median (min, max)	187.0 (0.5, 1199417.0)		1656.0 (0.0, 90093904.0)		1900.1 (1.4, 26434900.0)		1792.0 (0.0, 90093904.0)	
Not available, No. (%)	10473	39.5	2737	39.5	2622	30.5	5359	34.5
Missing, No. (%)	4483	16.9	1078	15.6	1348	15.7	2426	15.6
Contrast type, No. (%)								
Ionic	229	0.9						
Non-ionic	24225	91.5						
Not available	1542	5.8						
Missing	487	1.8						
Contrast volume, ml								
N	23650		5937		7494		13431	
Mean (SD)	177.2 (68.9)		162.5 (69.4)		163.0 (68.5)		162.8 (68.9)	
Median (min, max)	150.0 (15.0, 500.0)		150.0 (16.0, 500.0)		150.0 (18.0, 500.0)		150.0 (16.0, 500.0)	
Not available, No. (%)	1891	7.1	529	7.6	549	6.4	1078	6.9
Missing, No. (%)	942	3.6	462	6.7	543	6.3	1005	6.5
Thrombolytics prior to PCI procedure in ACS STEMI, No. (%)								
<i>Total no. of procedures among ACS STEMI patients</i>	5722	100	1374	100	1741	100	3115	100
Yes	1258	22.0	607	44.2	706	40.6	1313	42.2
No	4458	77.9	767	55.8	1035	59.4	1802	57.8
Missing	6	0.1	0	0	0	0	0	0

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 26483		Total no. of procedures = 6928		Total no. of procedures = 8586		Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Duration of thrombolytics given prior to PCI procedure in ACS STEMI, No. (%)								
< 3 hrs	77	6.8	51	10.8	84	14.7	135	12.9
3 – 6 hrs	132	11.6	88	18.7	114	19.9	202	19.4
6 – 12 hrs	109	9.6	82	17.4	90	15.7	172	16.5
12 – 24 hrs	146	12.8	221	46.9	284	49.7	505	48.4
> 24 hrs			29	6.2	0	0	29	2.8
1 – 7 days	450	39.5						
> 7 days	225	19.7						
Not available	26		69		56		125	
Missing	93		67		78		145	

#Patients were allowed to be in more than one type of category

\$French size type was not available in the old CRF. In the old CRF, information on French size was only collected for guiding catheter

^French size is reported by number of lesions instead of number of procedures. In the old CRF, French size was reported under Section 6 cath lab visit, no 6b, whereas in the new CRF, it was reported under Section 7 PCI proc details, no 11

* In the new CRF, French size 9 was not listed. However, there was one patient with guiding catheter and French size 9 and three patients with guiding sheath and French size 9

^Results were presented differently in 2007 – 2012 and 2013 – 2014. In 2007 – 2012, patients were allowed to be presented in different categories. In 2013 – 2014, patients were included in a unique category

Single vessel disease is for patients with single vessel disease information (old CRF)/ patients with only one information of LAD, LCx, or RCA

Multiple vessel disease is for patients with multiple vessel disease information (old CRF)/patients with more than one information of LAD, LCx or RCA

Left main stem (LMS) is for patients with information on LMS (LMS alone or combination with LAD, LCx, RCA or single vessel disease)

Graft is for patients with information on graft (graft alone or combination with LAD, LCx, RCA, single vessel disease, multiple vessel disease or LMS)

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 26483		Total no. of procedures = 6928		Total no. of procedures = 8586		Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Iib/IIIa Blockade, No. (%)								
Yes	1275	4.8	238	3.4	347	4.0	585	3.8
No	25163	95.0	6690	96.6	8239	96.0	14929	96.2
Missing	45	0.2	0	0	0	0	0	0
Iib/IIIa Blockade given status, No. (%)								
Prior	447	37.9	64	29.2	150	50.5	214	41.5
During	629	53.3	25	11.4	20	6.7	45	8.7
After	104	8.8	130	59.4	127	42.8	257	49.8
Not available	23		0		1		1	
Missing	72		19		49		68	
Heparin, No. (%)								
Yes	25205	95.2	6576	94.9	8253	96.1	14829	95.6
No	1250	4.7	352	5.1	333	3.9	685	4.4
Missing	28	0.1	0	0	0	0	0	0
Heparin given status, No. (%)								
Prior	4863	19.7	2978	46.5	3588	44.5	6566	45.4
During	19789	80.2	5	0.1	2	0	7	0
After	35	0.1	3416	53.4	4470	55.5	7886	54.6
Not available	40		16		1		17	
Missing	478		161		192		353	
LMWH, No. (%)								
Yes	895	3.4	223	3.2	301	3.5	524	3.4
No	25520	96.4	6705	96.8	8285	96.5	14990	96.6
Missing	68	0.2	0	0	0	0	0	0
LMWH given status, No. (%)								
Prior	728	86.5	184	86.4	265	96.0	449	91.8
During	61	7.2	15	7.0	5	1.8	20	4.1
After	53	6.3	14	6.6	6	2.2	20	4.1
Not available	3		1		0		1	
Missing	50		9		25		34	

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 26483		Total no. of procedures = 6928		Total no. of procedures = 8586		Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Ticlopidine, No. (%)								
Yes	542	2.0	93	1.3	65	0.8	158	1.0
No	25891	97.8	6835	98.7	8521	99.2	15356	99.0
Missing	50	0.2	0	0	0	0	0	0
Ticlopidine given status, No. (%)								
Prior	492	96.9	86	96.6	60	98.4	146	97.3
During	10	1.9	0	0	1	1.6	1	0.7
After	6	1.2	3	3.4	0	0	3	2.0
Not available	7		0		0		0	
Missing	27		4		4		8	
Aspirin, No. (%)								
Yes	25788	97.4	6751	97.4	8242	96.0	14993	96.6
No	668	2.5	177	2.6	344	4.0	521	3.4
Missing	27	0.1	0	0	0	0	0	0
Aspirin given status, No. (%)								
Prior	24679	98.6	6488	98.7	7950	99.2	14438	98.9
During	237	0.9	52	0.8	11	0.1	63	0.4
After	119	0.5	34	0.5	60	0.7	94	0.7
Not available	191		3		6		9	
Missing	562		174		215		389	
Clopidogrel, No. (%)								
Yes	25933	97.9	6355	91.7	7724	90.0	14079	90.8
No	531	2.0	573	8.3	862	10.0	1435	9.2
Missing	19	0.1	0	0	0	0	0	0
Clopidogrel given status, No. (%)								
Prior	24807	97.0	5862	93.3	7331	95.9	13193	94.7
During	351	1.4	28	0.4	19	0.2	47	0.3
After	404	1.6	398	6.3	301	3.9	699	5.0
Not available	178		8		6		14	
Missing	193		59		67		126	

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 26483		Total no. of procedures = 6928		Total no. of procedures = 8586		Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Duration of clopidogrel given prior to PCI procedure, hrs, No. (%)								
< 6	5872	25.3	1593	29.5	2058	30.1	3651	29.9
6 – 24	7485	32.2	1246	23.1	1893	27.6	3139	25.6
> 24 – 72	4127	17.7	533	9.9	719	10.5	1252	10.2
> 72	5771	24.8	2021	37.5	2181	31.8	4202	34.3
Not available	677		192		92		284	
Missing	875		277		388		665	
First starting dose, mg, No. (%)								
75	11567	50.8	2725	50.4	3719	55.3	6444	53.1
300	8977	39.4	2174	40.2	2299	34.2	4473	36.9
600	2237	9.8	509	9.4	706	10.5	1215	10.0
≥ 1200	6	0.0	1	0.0	0	0	1	0.0
Not available	1187		289		199		488	
Missing	1959		657		801		1458	
*Clopidogrel dose of ACS STEMI patient, mg, No. (%)								
<i>Total no. of PCI procedures among ACS STEMI patients who were taking clopidogrel.</i>	5629	100	1183	100	1499	100	2682	100
75	2441	47.8	187	19.9	372	30.2	559	25.8
300	2165	42.5	607	64.7	705	57.4	1312	60.5
600	497	9.7	145	15.4	152	12.4	297	13.7
≥ 1200	2	0.0	0	0	0	0	0	0
Not available	211		50		25		75	
Missing	313		194		245		439	
Fondaparinox, No. (%)								
Yes	582	2.2	751	10.8	645	7.5	1396	9.0
No	14135	53.4	6128	88.5	7941	92.5	14069	90.7
Missing	11766	44.4	49	0.7	0	0	49	0.3
Fondaparinox given status, No. (%)								
Prior	482	93.6	635	86.9	576	95.2	1211	90.6
During	5	1.0	91	12.4	21	3.5	112	8.4
After	28	5.4	5	0.7	8	1.3	13	1.0
Not available	6		1		1		2	
Missing	61		19		39		58	

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 26483		Total no. of procedures = 6928		Total no. of procedures = 8586		Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Prasugrel, No. (%)								
Yes			23	0.3	44	0.5	67	0.4
No			5517	79.6	8539	99.5	14056	90.6
Missing			1388	20.1	3	0.0	1391	9.0
Prasugrel given status, No. (%)								
Prior			19	90.5	29	74.4	48	80.0
During			2	9.5	2	5.1	4	6.7
After			0	0	8	20.5	8	13.3
Not available			0		0		0	
Missing			2		5		7	
Ticagrelor, No. (%)								
Yes			561	8.1	1071	12.5	1632	10.5
No			4979	71.9	7512	87.5	12491	80.5
Missing			1388	20.0	3	0.0	1391	9.0
Ticagrelor given status, No. (%)								
Prior			414	81.0	830	82.7	1244	82.1
During			21	4.1	24	2.4	45	3.0
After			76	14.9	150	14.9	226	14.9
Not available			1		0		1	
Missing			49		67		116	
Planned duration of clopidogrel/ticlopidine, month, No. (%)								
1	4846	18.3	714	10.3	579	6.6	1293	8.3
3	1417	5.4	287	4.1	245	2.9	532	3.4
6	1882	7.1	335	4.8	413	4.8	748	4.8
12	14619	55.2	5034	72.7	6807	79.3	11841	76.3
> 12	1774	6.7	88	1.3	65	0.8	153	1.1
Not available	1317	4.9	311	4.5	349	4.1	660	4.3
Missing	628	2.4	159	2.3	128	1.5	287	1.8

**Only applicable to STEMI patients who were taking clopidogrel*

Table 3.2 Duration of thienopyridine in patients who underwent PCI, NCVD-PCI Registry, 2007 – 2014

Year	Planned duration of clopidogrel/ticlopidine (months)	#Intracoronary devices used					
		Balloon only/POBA		Drug-eluting stent		Bare metal stent	
		No.	%	No.	%	No.	%
2007 – 2012 Total no. of lesions = 34873	1	588	23.6	299	1.5	4409	45.4
	3	142	5.7	433	2.1	867	8.9
	6	210	8.4	1317	6.5	843	8.7
	12	1100	44.2	15485	76.0	2472	25.4
	> 12	156	6.3	1790	8.8	534	5.5
	Not available	253	10.2	553	2.7	415	4.3
	Missing	41	1.6	493	2.4	176	1.8
	Total	2490	100.0	20370	100.0	9716	100.0
2013 Total no. of lesions = 8517	1	165	18.7	51	0.9	563	39.6
	3	65	7.4	47	0.8	133	9.4
	6	38	4.3	120	2.1	103	7.3
	12	527	59.6	5149	90.8	525	37.0
	> 12	16	1.8	76	1.3	9	0.6
	Not available	55	6.2	118	2.1	53	3.7
	Missing	18	2.0	116	2.0	34	2.4
	Total	884	100.0	5677	100.0	1420	100.0
2014 Total no. of lesions = 10812	1	174	10.9	129	1.7	323	31.1
	3	57	3.5	49	0.7	92	8.9
	6	94	5.8	209	2.9	66	6.4
	12	1158	72.0	6667	91.1	501	48.5
	> 12	22	1.4	53	0.7	4	0.4
	Not available	80	5.0	128	1.7	34	3.3
	Missing	23	1.4	86	1.2	14	1.4
	Total	1608	100.0	7321	100.0	1034	100.0
2013 – 2014 Total no. of lesions = 19329	1	339	13.7	180	1.4	886	36.1
	3	122	4.9	96	0.7	225	9.2
	6	132	5.3	329	2.5	169	6.9
	12	1685	67.6	11816	90.9	1026	41.8
	> 12	38	1.5	129	1.0	13	0.5
	Not available	135	5.4	246	1.9	87	3.5
	Missing	41	1.6	202	1.6	48	2.0
	Total	2492	100.0	12998	100.0	2454	100.0

*Patients were allowed to be in more than one type of category

Table 3.3 Access site of patients who underwent procedures, by PCI status, NCVD-PCI Registry, 2007 – 2014

Year	#Percutaneous entry	PCI status											
		Elective		NSTEMI/UA		AMI		Not available		Missing		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of procedures = 26483	Brachial	167	91.3	7	3.8	8	4.4	1	0.5	0	0	183	100
	Radial	10378	91.8	444	3.9	467	4.2	10	0.1	2	0.0	11301	100
	Femoral	11475	82.8	903	6.5	1463	10.6	13	0.1	3	0.0	13857	100
2013 Total no. of procedures = 6928	Brachial	51	1.0	4	0.6	12	1.0	0	0	0	0	67	1.0
	Radial	2947	57.0	333	52.3	483	38.9	0	0	0	0	3763	53.4
	Femoral	2173	42.0	300	47.1	748	60.2	0	0	0	0	3221	45.6
2014 Total no. of procedures = 8586	Brachial	27	0.4	9	1.2	11	0.8	0	0	0	0	47	0.5
	Radial	3969	58.5	449	57.4	665	45.4	0	0	0	0	5083	56.3
	Femoral	2786	41.1	324	41.4	789	53.9	0	0	0	0	3899	43.2
2013 – 2014 Total no. of procedures = 15514	Brachial	78	0.7	13	0.9	23	0.8	0	0	0	0	114	0.7
	Radial	6916	57.9	782	55.1	1148	42.4	0	0	0	0	8846	55.0
	Femoral	4959	41.5	624	44.0	1537	56.8	0	0	0	0	7120	44.3

[#]Patients were allowed to be in more than one type of category

LESION CHARACTERISTICS

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Summary

1. LAD remains the most commonly treated lesion, as reported in previous years.
2. Complex lesions (B2 and C) made up 59% of all PCIs with an increase in the rate of type C lesions compared to the previous years.
3. DES is the most commonly used stent (69.7%); its use increased compared to the previous years.
4. Most of ISR lesions were treated with drug-eluting balloon (DEB).
5. The rate of procedural complications remained low.
6. A significant increase in the number of LMS intervention (541 lesions) was reported in the 2013 – 2014 cohort compared to 2007–2012. Majority of the lesions were treated with DES (84.3%), and were interestingly followed by DEB (3.8%) and BMS (3.4%). The success rate was 98.5%.
7. Most of the graft PCIs was performed on SVG. When compared to the previous registry, the incidence of in-stent restenosis was slightly higher (10.8% vs. 9.0%), and the use of DEB in PCI to grafts had significantly increased in this cohort compared to the 2007 – 2012 cohort (15.7% vs. 9.8%).
8. Majority of CTO lesions were de novo lesions. Approximately half of the CTO PCI was performed via radial approach, however in the past radial approach was only 34.2%.

Anatomical location of lesions

A total of 19,392 lesions were treated from the years 2013 to 2014. LAD remained the most common location (48.1%) followed by RCA (31.2%) and left circumflex (16.9%). The proximal segment of each vessel (LAD/RCA/LCx) was the most frequently treated. [Table 4.1]

There was a slight increase in LMS lesion (2.8%), but a reduction in graft PCI (0.9%) compared to the previous years. The saphenous vein graft was the most commonly treated graft (0.8%). The comparison in lesion location between 2013 to 2014 and 2007 to 2012 did not show any significant difference. [Table 4.1.1]

Table 4.1 Summary of location of lesions treated with percutaneous coronary intervention, NCVD-PCI Registry, 2007 – 2014

Location of lesion	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
None	3	0.0	0	0	5	0	5	0
Left main stem	749	2.2	223	2.6	318	2.9	541	2.8
Left anterior descending artery (LAD)	16631	47.7	4120	48.4	5184	47.9	9304	48.1
LAD proximal	11604	33.3	2910	34.3	3567	33.0	6477	33.5
LAD mid	3626	10.4	895	10.5	1203	11.1	2098	10.9
LAD distal	520	1.5	148	1.7	202	1.9	350	1.8
D1	798	2.3	144	1.7	181	1.7	325	1.7
D2	72	0.2	20	0.2	26	0.2	46	0.2
D3	11	0.0	3	0	5	0	8	0
Right coronary artery (RCA)	10472	30.0	2722	31.9	3289	30.6	6011	31.2
RCA proximal	4655	13.3	1194	14.0	1513	14.1	2707	14.0
RCA mid	3351	9.6	845	9.9	984	9.1	1829	9.5
RCA distal	1848	5.3	512	6.0	568	5.3	1080	5.6
PDA	297	0.9	83	1.0	125	1.2	208	1.1
PLV	321	0.9	88	1.0	99	0.9	187	1.0
Left circumflex artery (LCx)	6370	18.3	1372	16.1	1915	17.7	3287	16.9
LCX proximal	2882	8.3	681	8.0	967	8.9	1648	8.5
LCX distal	2135	6.1	408	4.8	577	5.4	985	5.1
OM1	1060	3.0	229	2.7	299	2.8	528	2.7
OM2	229	0.7	42	0.5	58	0.5	100	0.5
OM3	64	0.2	12	0.1	14	0.1	26	0.1
Graft	481	1.3	75	0.9	91	0.8	166	0.9
Saphenous vein graft	423	1.2	68	0.8	81	0.7	149	0.8
Left internal mammary artery graft	51	0.1	5	0.1	10	0.1	15	0.1
Right internal mammary artery graft	3	0.0	0	0	0	0	0	0
Radial artery graft	4	0.0	2	0	0	0	2	0
Missing	167	0.5	5	0.1	10	0.1	15	0.1

Table 4.1.1 Comparison between 2007 – 2012 and 2013 – 2014 results

Location of lesion	2007 – 2012 Total no. of lesions = 34873		2013 – 2014 Total no. of lesions = 19329		p-value
	No.	%	No.	%	
Left main stem	749	2.2	541	2.8	0.492
Left anterior descending artery (LAD)	16631	47.7	9304	48.1	0.536
Right coronary artery (RCA)	10472	30.0	6011	31.2	0.107
Left circumflex artery (LCx)	6370	18.3	3287	16.9	0.089
Graft	481	1.3	166	0.9	0.683

Lesion characteristics

Of all lesions treated with PCI, 87.5% achieved TIMI III flow. [Table 4.5] A large majority of lesions treated were the de novo type (94.9%). The rate of PCI due to stent thrombosis remained low at 0.4% from 2007 – 2014. [Table 4.2] There was a reducing trend for in-stent restenosis intervention (4.2% in 2013 – 2014 vs. 4.7% in 2007 – 2012).

Complex lesions (Type B2 and C) made up 59.0% of all PCIs. There is an increase in the rate of Type C lesions compared to years 2007 to 2012. [Table 4.3]

Among the high-risk lesions, there appeared to be an increase in ostial and thrombotic PCIs and decrease in bifurcation and CTO PCIs. [Table 4.4] Calcified lesion PCI made up 6.0% of high risk PCI. [Table 4.4] There was an increase in LMS PCI. (2.8% vs. 2.2%). [Table 4.1]

Types of stents and devices used

Drug-eluting stent remained as the most used stent (69.7%), and its use increased compared to the previous years, 2007 to 2012 (58.8%). The use of bare-metal stents showed a gradual decrease in trend, however, they were still the second most used device (11.9%). There was also an increased use of bio-absorbable stents, combo stents, and drug-eluting balloons in 2013 – 2014. The use of bifurcated and covered stents were rare and combined constituted < 0.5% of stents. [Table 4.6]

POBA was only done in 12.9% of lesions treated and this was interestingly higher than years 2007 to 2012 (7.1%). Cutting balloon/scoring balloon and rotablator use were low at 1.4% and 0.9%, respectively. [Table 4.8]

The use of intravascular guided imaging PCI and physiological assessment (FFR) were low. The IVUS study was 2.7%, OCT was 0.8%, and FFR was 1.2%. [Table 4.8].

Lesion complication during PCI

The rate of complication was low with dissection occurring in 1.7% (non-flow limiting in 85.6%), no reflow in 0.6% (69.6% transient), and perforation in 0.3% of all treated lesions. The rate of dissection and no reflow, both showed decreasing trends compared to years 2007 to 2012, but perforation rate remained constant. [Table 4.9]

Table 4.2 Characteristics of lesions treated by PCI, NCVD-PCI Registry, 2007 – 2014

Types of lesions	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
De novo	32543	93.3	8066	94.7	10281	95.0	18347	94.9
Restenosis (no prior stent)	65	0.2	8	0.1	11	0.1	19	0.1
Stent thrombosis	147	0.4	45	0.5	40	0.4	85	0.4
In-stent restenosis	1618	4.7	366	4.3	438	4.1	804	4.2
Not available	284	0.8	32	0.4	42	0.4	74	0.4
Missing	216	0.6	0	0	0	0	0	0
Total	34873	100.0	8517	100.0	10812	100.0	19329	100.0

Table 4.3 Prevalence of lesions according to the American College of Cardiology (ACC) classifications, NCVD-PCI Registry, 2007 – 2014

Types of lesions	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
A	3926	11.2	991	11.6	1188	11.0	2179	11.2
B1	9102	26.1	2276	26.7	3215	29.7	5491	28.4
B2	8199	23.5	1299	15.3	1464	13.5	2763	14.3
C	12855	36.9	3846	45.2	4788	44.3	8634	44.7
Not available	591	1.7	105	1.2	157	1.5	262	1.4
Missing	200	0.6	0	0	0	0	0	0
Total	34873	100.0	8517	100.0	10812	100.0	19329	100.0

Table 4.4 Prevalence of high risk lesion type, NCVD-PCI Registry, 2007 – 2014

#Types of lesions	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
Ostial	2361	6.8	604	7.1	831	7.7	1435	7.4
Bifurcation	3285	9.4	560	6.6	699	6.5	1259	6.5
Total occlusion	1617	4.6	523	6.1	617	5.7	1140	5.9
CTO > 3 mo	2626	7.5	550	6.5	735	6.8	1285	6.6
Thrombus	1080	3.1	467	5.5	618	5.7	1085	5.6
Calcified lesion			293	3.4	867	8.0	1160	6.0
LMS			162	1.9	263	2.4	425	2.2

[#]Patients were allowed to be in more than one type of category

Table 4.5 Comparison of TIMI flow grade by pre- and post-procedure, NCVD-PCI Registry, 2007 – 2014

TIMI Flow Grade	2007 – 2012 Total no. of lesions = 34873				2013 Total no. of lesions = 8517				2014 Total no. of lesions = 10812				2013 – 2014 Total no. of lesions = 19329			
	Pre-procedure		Post-procedure		Pre-procedure		Post-procedure		Pre-procedure		Post-procedure		Pre-procedure		Post-procedure	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
TIMI-0	4296	12.3	656	1.9	1177	13.8	154	1.9	1418	13.2	190	1.8	2595	13.4	344	1.8
TIMI-1	2493	7.2	129	0.4	928	10.9	45	0.5	625	5.8	40	0.4	1553	8.0	85	0.4
TIMI-2	6657	19.1	351	1.0	2386	28.0	149	1.7	2360	21.8	177	1.6	4746	24.6	326	1.7
TIMI-3	18770	53.8	31050	89.0	3260	38.3	7546	88.6	5147	47.6	9361	86.6	8407	43.5	16907	87.5
Not available	383	1.1	354	1.0	317	3.7	199	2.3	273	2.5	189	1.7	590	3.1	388	2.0
Missing	2274	6.5	2333	6.7	449	5.3	424	5.0	989	9.1	855	7.9	1438	7.4	1279	6.6
Total	34873	100.0	34873	100.0	8517	100.0	8517	100.0	10812	100.0	10812	100.0	19329	100.0	19329	100.0

Table 4.6 Types of stents used, NCVD-PCI Registry, 2007 – 2014

Types of stents	2007 – 2012 Total no. of stents used = 43839		2013 Total no. of stents used = 10415		2014 Total no. of stents used = 13123		2013 – 2014 Total no. of stents used = 23538	
	No.	%	No.	%	No.	%	No.	%
Drug-eluting stent	25786	58.8	7229	69.4	9183	69.9	16412	69.7
Bare metal stent	10354	23.6	1613	15.5	1189	9.1	2802	11.9
Bio-absorbable stent	37	0.1	90	0.9	204	1.6	294	1.2
Antibody-coated stent	629	1.5	28	0.3	20	0.2	48	0.2
Others	2812	6.4	160	1.5	130	0.9	290	1.2
Drug-eluting balloon	0	0	518	4.9	1054	8	1572	6.7
Bifurcated stent	0	0	42	0.4	28	0.2	70	0.3
Covered stent	13	0.0	0	0	23	0.2	23	0.1
Combo stent	0	0	226	2.2	665	5.1	891	3.9
Missing	4208	9.6	509	4.9	627	4.8	1136	4.8
Total	43839	100.0	10415	100.0	13123	100.0	23538	100.0

Table 4.7 Lesion characteristics for patients who underwent PCI, NCVD-PCI Registry, 2007 – 2014

	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
Pre-procedure stenosis, %								
N	32953		8039		10386		18425	
Mean (SD)	84.8 (12.2)		86.7 (12.0)		86.5 (11.4)		86.6 (11.7)	
Median (min, max)	90.0 (0.0, 100.0)		90.0 (0.0, 100.0)		90.0 (0.0, 100.0)		90.0 (0.0, 100.0)	
Missing, No. (%)	1920	5.5	478	5.6	426	3.9	904	4.7
Post-procedure stenosis, %								
N	31566		8070		10459		18529	
Mean (SD)	4.3 (18.4)		4.2 (18.0)		4.2 (17.8)		4.2 (17.9)	
Median (min, max)	0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)	
Missing, No. (%)	3307	9.5	447	5.2	353	3.3	800	4.1
Estimated lesion length, mm								
N	31733		7845		10029		17874	
Mean (SD)	23.6 (14.2)		24.7 (15.7)		25.9 (15.8)		25.4 (15.7)	
Median (min, max)	20.0 (1.0, 142.0)		20.0 (1.0, 129.0)		21.0 (2.0, 131.0)		20.0 (1.0, 131.0)	
Missing, No. (%)	3140	9.0	672	7.9	783	7.2	1455	7.5
Lesion result, No. (%)								
Successful	33515	96.1	8245	96.8	10424	96.4	18669	96.6
Unsuccessful	1094	3.1	256	3.0	344	3.2	600	3.1
Not available	37	0.1	16	0.2	44	0.4	60	0.3
Missing	227	0.7	0	0	0	0	0	0
*Stent length, mm								
N	30445		7699		9879		17578	
Mean (SD)	29.4 (16.7)		29.8 (17.0)		30.5 (16.9)		30.2 (16.9)	
Median (min, max)	24.0 (8.0, 166.0)		24.0 (8.0, 140.0)		26.0 (8.0, 167.0)		25.0 (8.0, 167.0)	
Not available, No. (%)	4428	12.7	818	9.6	933	8.6	1751	9.1
**Stent diameter, mm								
N	30329		7695		9867		17562	
Mean (SD)	3.0 (0.4)		2.9 (0.4)		2.9 (0.4)		2.9 (0.4)	
Median (min, max)	3.0 (2.0, 7.0)		3.0 (2.0, 5.8)		3.0 (2.0, 5.0)		3.0 (2.0, 5.8)	
Not available, No. (%)	4544	13.0	822	9.7	945	8.7	1767	9.1

	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
Maximum balloon size used, mm								
N	31663		7729		10029		17758	
Mean (SD)	3.1 (0.6)		3.0 (0.6)		3.1 (0.6)		3.0 (0.6)	
Median (min, max)	3.0 (1.0, 6.0)		3.0 (1.0, 6.0)		3.0 (1.0, 5.2)		3.0 (1.0, 6.0)	
Missing, No. (%)	3210	9.2	788	9.3	783	7.2	1571	8.1
Maximum stent/balloon deploy pressure, atm								
N	31552		7662		9909		17571	
Mean (SD)	15.7 (4.0)		15.8 (4.2)		15.7 (4.5)		15.7 (4.4)	
Median (min, max)	16.0 (1.0, 30.0)		16.0 (1.0, 40.0)		16.0 (1.0, 40.0)		16.0 (1.0, 40.0)	
Missing, No. (%)	3321	9.5	855	10.0	903	8.4	1758	9.1
Direct stenting, No. (%)								
Yes	4147	11.9	650	7.6	752	7.0	1402	7.3
No	29149	83.6	7453	87.5	9932	91.9	17385	89.9
Not applicable	1375	3.9	414	4.9	128	1.2	542	2.8
Missing	202	0.6	0	0	0	0	0	0
Other adjunctive procedure, No. (%)								
Yes			171	2.0	233	2.2	404	2.1
IABP								
Ventilator			42	24.6	90	38.6	132	32.7
Temporary cardiac pacing wire			36	21.1	43	18.5	79	19.6
No			6135	72.0	10367	95.8	16502	85.3
Not applicable			272	3.2	30	0.3	302	1.6
Missing			1939	22.8	182	1.7	2121	11.0

*Summation of stent length was used for lesions which were treated with more than one stent

**Average of stent diameter was used for lesions which were treated with more than one stent

Table 4.8 Types of devices used during percutaneous coronary intervention, NCVD-PCI Registry, 2007 – 2014

#Intracoronary devices	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
Aspiration/aspiration catheter	523	1.5	478	5.6	628	5.8	1106	5.7
Balloon only/POBA	2490	7.1	884	10.4	1608	14.9	2492	12.9
Drug-eluting balloon	1674	4.8	528	6.2	929	8.6	1457	7.5
Drug-eluting stent	20370	58.4	5677	66.7	7321	67.7	12998	67.2
Cutting balloon/scoring balloon	645	1.8	120	1.4	159	1.5	279	1.4
Coil			15	0.2	4	0	19	0.1
OCT			51	0.6	110	1.0	161	0.8
Mother and child			8	0.1	15	0.1	23	0.1
Micro catheter			348	4.1	536	5.0	884	4.6
Angiojet			7	0.1	19	0.2	26	0.1
IVUS	1248	3.6	258	3.0	258	2.4	516	2.7
Flowire/FFR	78	0.2	100	1.2	132	1.2	232	1.2
Rotablator	309	0.9	81	1.0	101	0.9	182	0.9
Bare metal stent	9716	27.9	1420	16.7	1034	9.6	2454	12.7
Embolic protection	140	0.4	22	0.3	9	0.1	31	0.2
Filter			5	83.3	5	100	10	90.9
Balloon/distal			0	0	0	0	0	0
Proximal			1	16.7	0	0	1	9.1
Missing			16		4		20	
Others	1795	5.1	1260	14.8	482	4.5	1742	9.0

#Patients were allowed to be in more than one type of category

Table 4.9 Types of post-procedure complications, NCVD-PCI Registry, 2007 – 2014

*Types of post-procedure complications	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
Dissection	1102	3.2	155	1.8	169	1.6	324	1.7
Flow limiting			22	16.3	20	12.8	42	14.4
Non-flow limiting			113	83.7	136	87.2	249	85.6
Not available			9		13		22	
Missing			11		0		11	
No reflow	368	1.1	64	0.8	56	0.5	120	0.6
Transient	265	78.2	43	69.4	35	70.0	78	69.6
Persistent	74	21.8	19	30.6	15	30.0	34	30.4
Not available	20		2		6		8	
Missing	9		0		0		0	
Acute closure	95	0.3						
Perforation	94	0.3	23	0.3	26	0.2	49	0.3

**Results are only showed for patients who were reported to have the complications*

In-stent restenosis (ISR)

A total of 804 ISR lesions were treated in 2013 to 2014. [Table 4.2] Of these, 24.1% were presented with acute coronary syndrome (ACS). [Table 4.10]

Drug-eluting balloon was the most frequently used treatment (57.6%), followed by drug-eluting stents (31%), POBA (23.6%), and cutting/scoring balloon (12.6%). [Table 4.11 and Table 4.12] The IVUS was used in 10.4% when treating ISR. The use of other types of treatment modalities were infrequent. There was a gradual decrease in DES used in ISR. [Table 4.11]

The complication rate during the treatment of ISR was very low. Dissection occurred in 1.4% and no-reflow in 0.1%. [Table 4.13]

Table 4.10 Acute coronary syndrome status of in-stent restenosis percutaneous coronary intervention, NCVD-PCI Registry, 2007 – 2014

Types of prior stents used in ISR	2007 – 2012 Total no. of lesions = 1618		2013 Total no. of lesions = 366		2014 Total no. of lesions = 438		2013 – 2014 Total no. of lesions = 804	
	No.	%	No.	%	No.	%	No.	%
Acute coronary syndrome, No. (%)								
Yes	541	33.5	85	23.2	109	24.9	194	24.1
No	1070	66.1	281	76.8	329	75.1	610	75.9
Missing	7	0.4	0	0	0	0	0	0
ACS type, No. (%)								
STEMI	203	37.6	23	27.7	36	33.4	59	30.9
NSTEMI	236	43.7	22	26.5	36	33.3	58	30.4
UA	101	18.7	38	45.8	36	33.3	74	38.7
Not available	1		2		1		3	
Missing	0		0		0		0	
STEMI, No. (%)								
Anterior			16	76.2	23	67.6	39	70.9
Non-anterior			5	23.8	11	32.4	16	29.1
Not available			2		2		4	
Missing			0		0		0	
Total	1618	100.0	366	100.0	438	100.0	804	100.0

Table 4.11 Types of stents used in the in-stent restenosis, NCVD-PCI Registry, 2007 – 2014

Types of stents used in the ISR	2007 – 2012 Total no. of stents used = 1859		2013 Total no. of stents used = 360		2014 Total no. of stents used = 507		2013 – 2014 Total no. of stents used = 867	
	No.	%	No.	%	No.	%	No.	%
Drug-eluting stent	804	43.2	142	39.4	159	31.4	301	34.7
Bare metal stent	128	6.9	12	3.4	10	2	22	2.5
Bio-absorbable stent	1	0.1	0	0	1	0.2	1	0.1
Antibody-coated stent	5	0.3	0	0	0	0	0	0
Others	84	4.5	1	0.3	3	0.6	4	0.5
Drug-eluting balloon	0	0	197	54.7	314	61.9	511	59.0
Bifurcated stent	0	0	0	0	1	0.2	1	0.1
Covered stent	2	0.1	0	0	0	0	0	0
Combo stent	0	0	3	0.8	8	1.5	11	1.3
Missing	835	44.9	5	1.4	11	2.2	16	1.8
Total	1859	100.0	360	100.0	507	100.0	867	100.0

Table 4.12 Types of devices used in the in-stent restenosis, NCVD-PCI Registry, 2007 – 2014

#Intracoronary devices used in ISR	2007 – 2012 Total no. of lesions = 1618		2013 Total no. of lesions = 366		2014 Total no. of lesions = 438		2013 – 2014 Total no. of lesions = 804	
	No.	%	No.	%	No.	%	No.	%
Aspiration/aspiration catheter	17	1.1	10	2.7	14	3.2	24	3.0
Balloon only/POBA	382	23.6	92	25.1	98	22.4	190	23.6
Drug-eluting balloon	483	29.9	195	53.3	268	61.2	463	57.6
Drug-eluting stent	613	37.9	120	32.8	129	29.5	249	31.0
Cutting balloon/scoring balloon	290	17.9	46	12.6	55	12.6	101	12.6
Coil			1	0.3	0	0	1	0.1
OCT			10	2.7	10	2.3	20	2.5
Mother and child			0	0	0	0	0	0
Micro catheter			21	5.7	33	7.5	54	6.7
Angiojet			0	0	0	0	0	0
IVUS	315	19.5	45	12.3	39	8.9	84	10.4
Flowire/FFR	4	0.2	3	0.8	9	2.1	12	1.5
Rotablator	10	0.6	3	0.8	0	0	3	0.4
Bare metal stent	107	6.6	10	2.7	10	2.3	20	2.5
Embolic protection	7	0.4	0	0	1	0.2	1	0.1
Filter			0	0	0	0	0	0
Balloon/distal			0	0	0	0	0	0
Proximal			0	0	0	0	0	0
Missing			0		1		1	
Others	68	4.2	39	10.7	17	3.9	56	7.0

*Patients were allowed to be in more than one type of category

Table 4.13 Types of complications in post in-stent restenosis, NCVD-PCI Registry, 2007 – 2014

*Types of complications in ISR	2007 – 2012 Total no. of lesions = 1618		2013 Total no. of lesions = 366		2014 Total no. of lesions = 438		2013 – 2014 Total no. of lesions = 804	
	No.	%	No.	%	No.	%	No.	%
Dissection	36	2.2	1	0.3	10	2.3	11	1.4
Flow limiting			0	0	1	10.0	1	9.1
Non-flow limiting			1	100	9	90.0	10	90.9
Not available			0		0		0	
Missing			0		0		0	
No reflow	11	0.7	0	0	1	0.2	1	0.1
Transient	10	90.9	0	0	0	0	0	0
Persistent	1	9.1	0	0	0	0	0	0
Not available	0		0		1		1	
Missing	0		0		0		0	
Acute closure	2	0.1						
Perforation	9	0.6	0	0	0	0	0	0

*Results are only showed for patients with the complications

PCI of left main stem (LMS)

From 2013 to 2014, a total of 541 LMS interventions were performed. [Table 4.1] Most were de novo lesions and 5.2% were in-stent restenosis. [Table 4.14] From 2007 – 2012, the number of LMS PCI performed were 749, however in this 2013 – 2014 cohort, there was a significant increase in the number of LMS PCIs. [Table 4.1.1]

Majority of LMS interventions were performed on unprotected LMS, and this was almost similar to the 2007 – 2012 cohort; only 12.8% had history of previous coronary artery bypass (CABG) surgery. [Table 4.15]

For LMS PCI, the use of femoral artery route was more common (70.4%) than non LMS intervention. [Table 4.15]

Majority of LMS interventions were elective cases (77.3%), followed by NSTEMI/UA (11.8%) and STEMI (10.9%). [Table 4.15] Among the STEMI group, 46% had primary PCI, followed by 41.1% rescue PCI and the rest were delayed PCI. There was an increasing trend of LMS PCI in the ACS setting compared to the 2007 – 2012 cohort. [Table 4.15]

In 2007 – 2012, the mean pre-procedure stenosis was 80.9% with TIMI III flow in 57.8%; the mean lesion length was 27.1 mm. The present cohort (2013 – 2014) shows that we were treating more complex lesions (severe stenosis and longer lesions) with mean pre-procedure stenosis of 83% (SD 13.2) with TIMI III flow in only 39.9% cases; the mean lesion length was 28.7 mm. Post procedure results were excellent showing 91.6% achieving TIMI III flow and less than 1% with TIMI 0 to TIMI I flow. [Table 4.15 and Table 4.16]

Majority of the lesions were treated with DES (84.3%), and interestingly were followed by DEB (3.8%) and BMS (3.4%); the rest were treated with various other stents (Combo, Bio-absorbable etc). [Table 4.17] The mean stent length and diameter were 34.0 mm (SD 20.5 mm) and 3.3 mm (SD 0.4 mm), respectively. Conventional pre-dilatation followed by stenting was the preferred choice, however, direct stenting was also observed in 6.7%. [Table 4.15]

Despite dealing with more complex lesions compared to the past, the use of IVUS had become increasingly uncommon (27.1%, 2007 – 2012 vs. 20%, 2013 – 2014). [Table 4.18] However, the success rate was 98.5%, with very few complications like dissection (3%). Most of the dissections were non-flow limiting, and no reflow was observed in 0.9%. [Table 4.15 and Table 4.19]

About 84.5% of patients received DAPT for 12 months. The use of DAPT for more than 12 months was observed in only 4.8% vs. 25.2% (2007 – 2012); this significant reduction could be due to newer generation stents with more promising evidence. [Table 4.20]

Table 4.14 Types of lesions in left main stem procedure, NCVD-PCI Registry, 2007 – 2014

Types of lesion in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
De novo	693	92.5	208	93.4	298	93.7	506	93.5
Restenosis (no prior stent)	3	0.4	1	0.4	0	0	1	0.2
Stent thrombosis	2	0.3	1	0.4	4	1.3	5	0.9
In-stent restenosis	48	6.4	13	5.8	15	4.7	28	5.2
Previous DES	31	75.6	6	85.7	7	87.5	13	86.7
Previous BMS	10	24.4	1	14.3	1	12.5	2	13.3
Previous others	0	0	0	0	0	0	0	0
Not available	6		6		7		13	
Missing	1		0		0		0	
Not available	1	0.1	0	0	1	0.3	1	0.2
Missing	2	0.3	0	0	0	0	0	0
Total	749	100.0	223	100.0	318	100.0	541	100.0

Table 4.15 Clinical presentation of left main stem, NCVD-PCI Registry, 2007 – 2014

Clinical presentation in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
Acute coronary syndrome, No. (%)								
Total	241	100	59	100	98	100	157	100
STEMI	116	48.1	24	40.7	48	49.0	72	45.9
NSTEMI	95	39.4	19	32.2	27	27.6	46	29.3
UA	28	11.6	16	27.1	22	22.4	38	24.2
Not available	2	0.9	0	0	1	1.0	1	0.6
Missing								
Previous PCI, No. (%)								
Yes	210	28.0	74	33.2	111	34.9	185	34.2
No	539	72.0	149	66.8	207	65.1	356	65.8
Missing	0	0	0	0	0	0	0	0
Not available								
Previous CABG, No. (%)								
Yes	94	12.6	36	16.1	33	10.4	69	12.8
No	655	87.4	187	83.9	285	89.6	472	87.2
Missing	0	0	0	0	0	0	0	0
Not available								

Clinical presentation in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
PCI status, No. (%)								
Elective	666	88.9	179	80.2	239	75.1	418	77.3
NSTEMI/UA	40	5.4	24	10.8	40	12.6	64	11.8
AMI/STEMI	42	5.6	20	9.0	39	12.3	59	10.9
Not available	1	0.1	0	0	0	0	0	0
Missing	0	0	0	0	0	0	0	0
Elective, No. (%)								
Staged PCI			77	43.3	121	50.8	198	47.6
Ad hoc			101	56.7	117	49.2	218	52.4
Not available			1		1		2	
Missing			0		0		0	
NSTEMI/UA, No. (%)								
Urgent			4	16.7	14	35.9	18	28.6
Non-urgent			20	83.3	25	64.1	45	71.4
Not available			0		1		1	
Missing			0		0		0	
STEMI, No. (%)								
Rescue			7	41.2	16	41.0	23	41.1
Primary			7	41.2	19	48.7	26	46.3
Facilitated			0	0	0	0	0	0
Delayed PCI			0	0	0	0	0	0
Delayed routine PCI			1	5.9	2	5.1	3	5.4
Delayed selective PCI			2	11.7	1	2.6	3	5.4
Pharmacoinvasive			0	0	1	2.6	1	1.8
Not available			3		0		3	
#Percutaneous entry, No. (%)								
Brachial	3	0.4	1	0.4	0	0	1	0.2
Radial	184	24.6	79	35.4	107	33.6	186	34.4
Femoral	539	72.0	149	66.8	232	73.0	381	70.4
Pre-procedure % of stenosis								
N	693		202		302		504	
Mean (SD)	80.9 (14.6)		81.9 (14.4)		83.7 (12.3)		83.0 (13.2)	
Median (min, max)	80.0 (0.0, 100.0)		80.0 (0.0, 100.0)		85.0 (30.0, 100.0)		85.0 (0.0, 100.0)	
Missing, No. (%)	56	7.5	21	9.4	16	5.0	37	6.8

Clinical presentation in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
Pre-procedure TIMI flow, No. (%)								
TIMI-0	67	8.9	15	6.7	24	7.5	39	7.2
TIMI-1	44	5.9	25	11.2	16	5.0	41	7.6
TIMI-2	149	19.9	87	39.1	99	31.1	186	34.4
TIMI-3	433	57.8	73	32.7	143	45.1	216	39.9
Not available	4	0.5	10	4.5	5	1.6	15	2.8
Missing	52	7.0	13	5.8	31	9.7	44	8.1
Post-procedure % of stenosis								
N	660		205		311		516	
Mean (SD)	2.0 (10.6)		3.2 (14.8)		2.2 (12.4)		2.6 (13.4)	
Median (min, max)	0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)	
Missing, No. (%)	89	11.9	18	8.1	7	2.2	25	4.6
Post-procedure TIMI flow, No. (%)								
TIMI-0	7	0.9	1	0.4	1	0.3	2	0.4
TIMI-1	4	0.5	1	0.4	1	0.3	2	0.4
TIMI-2	7	0.9	4	1.8	5	1.6	9	1.7
TIMI-3	672	89.7	206	92.5	290	91.2	496	91.6
Not available	5	0.7	4	1.8	0	0	4	0.7
Missing	54	7.3	7	3.1	21	6.6	28	5.2
Estimated lesion length, mm								
N	673		210		302		512	
Mean (SD)	27.1 (17.5)		26.9 (20.1)		29.9 (19.6)		28.7 (19.8)	
Median (min, max)	20.0 (4.0, 90.0)		20.0 (3.0, 98.0)		24.0 (4.0, 100.0)		21.0 (3.0, 100.0)	
Missing, No. (%)	76	10.1	13	5.8	16	5.0	29	5.4
Lesion result, No. (%)								
Successful	737	98.4	220	98.7	313	98.4	533	98.5
Unsuccessful	11	1.5	3	1.3	5	1.6	8	1.5
Not available	0	0	0	0	0	0	0	0
Missing	1	0.1	0	0	0	0	0	0
*Stent length, mm								
N	692		209		307		516	
Mean (SD)	33.6 (20.1)		32.6 (21.0)		35.0 (20.2)		34.0 (20.5)	
Median (min, max)	28.0 (8.0, 108.0)		24.0 (8.0, 107.0)		29.0 (8.0, 102.0)		28.0 (8.0, 107.0)	
Not available, No. (%)	76	10.1	13	5.8	16	5.0	29	5.4

Clinical presentation in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
**Stent diameter, mm								
N	693		210		307		517	
Mean (SD)	3.3 (0.5)		3.3 (0.4)		3.3 (0.4)		3.3 (0.4)	
Median (min, max)	3.4 (2.3, 4.5)		3.3 (2.4, 4.5)		3.3 (2.3, 4.5)		3.3 (2.3, 4.5)	
Not available, No. (%)	56	7.5	13	5.8	11	3.5	24	4.4
Direct stenting, No. (%)								
Yes	60	8.0	17	7.6	19	6.0	36	6.7
No	674	90.0	195	87.5	297	93.4	492	90.9
Not applicable	15	2.0	11	4.9	2	0.6	13	2.4
Missing	0	0	0	0	0	0	0	0

*Patients were allowed to be in more than one type of category

*Summation of stent length was used for lesions which were treated with more than one stent

**Average of stent diameter was used for lesions which were treated with more than one stent

Table 4.16 TIMI flow prior to intervention in left main stem procedure, NCVD-PCI Registry, 2007 – 2014

TIMI flow prior to intervention in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
TIMI-0	67	8.9	15	6.7	24	7.5	39	7.2
TIMI-1	44	5.9	25	11.2	16	5.0	41	7.6
TIMI-2	149	19.9	87	39.1	99	31.1	186	34.4
TIMI-3	433	57.8	73	32.7	143	45.1	216	39.9
Not available	4	0.5	10	4.5	5	1.6	15	2.8
Missing	52	7.0	13	5.8	31	9.7	44	8.1
Total	749	100.0	223	100.0	318	100.0	541	100.0

Table 4.17 Types of stents used in left main stem procedure, NCVD-PCI Registry, 2007 – 2014

Types of stent used in left main stem procedure	2007 – 2012 Total no. of stents used = 1095		2013 Total no. of stents used = 300		2014 Total no. of stents used = 459		2013 – 2014 Total no. of stents used = 759	
	No.	%	No.	%	No.	%	No.	%
Drug-eluting stent	882	80.5	259	86.3	380	82.9	639	84.3
Bare metal stent	93	8.5	8	2.7	18	3.9	26	3.4
Bio-absorbable stent	0	0	0	0	1	0.2	1	0.1
Antibody-coated	15	1.4	0	0	1	0.2	1	0.1
Others	46	4.2	2	0.7	2	0.4	4	0.5
Drug-eluting balloon	0	0	10	3.3	19	4.1	29	3.8
Bifurcated stent	0	0	2	0.6	0	0	2	0.3
Covered stent	4	0.4	0	0	1	0.2	1	0.1
Combo stent	0	0	14	4.7	31	6.8	45	6.0
Missing	55	5.0	5	1.7	6	1.3	11	1.4
Total	1095	100.0	300	100.0	459	100.0	759	100.0

*Stents which were not listed in the NCVD-PCI Stent List

Table 4.18 Types of devices used in left main stem procedure, NCVD-PCI Registry, 2007 – 2014

# Intracoronary devices used in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
Aspiration/aspiration catheter	5	0.7	4	1.8	17	5.3	21	3.9
Balloon only/POBA	29	3.9	17	7.6	27	8.5	44	8.1
Drug-eluting balloon	49	6.5	13	5.8	16	5.0	29	5.4
Drug-eluting stent	613	81.8	187	83.9	257	80.8	444	82.1
Cutting balloon/scoring balloon	23	3.1	5	2.2	5	1.6	10	1.8
Coil			0	0	1	0.3	1	0.2
OCT			9	4.0	14	4.4	23	4.3
Mother and child			2	0.9	0	0	2	0.4
Micro catheter			15	6.7	21	6.6	36	6.7
Angiojet			0	0	0	0	0	0
IVUS	203	27.1	53	23.8	55	17.3	108	20.0
Flowire/FFR	1	0.1	5	2.2	2	0.6	7	1.3
Rotablator	36	4.8	14	6.3	16	5.0	30	5.5
Bare metal stent	78	10.4	8	3.6	14	4.4	22	4.1
Embolic protection	3	0.4	1	0.4	0	0	1	0.2
Others	30	4.0	16	7.2	16	5.0	32	5.9

#Patients were allowed to be in more than one type of category

Table 4.19 Types of complications in post left main stem, NCVD-PCI Registry, 2007 – 2014

Types of complications	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
#Types of complications								
Dissection	56	7.5	9	4.0	7	2.2	16	3.0
<i>Flow limiting</i>			2	28.6	2	28.6	4	28.6
<i>Non-flow limiting</i>			5	71.4	5	71.4	10	71.4
<i>Not available</i>			1		0		1	
<i>Missing</i>			1		0		1	
No reflow	11	1.5	2	0.9	3	0.9	5	0.9
<i>Transient</i>	8	72.7	1	50.0	0	0	1	20.0
<i>Persistent</i>	3	27.3	1	50.0	3	100	4	80.0
<i>Not available</i>	0		0		0		0	
<i>Missing</i>	0		0		0		0	
Acute closure	2	0.3						
Perforation	6	0.8	1	0.4	0	0	1	0.2

#Patients were allowed to be in more than one type of category

Table 4.20 Planned duration of dual antiplatelet therapy in left main stem procedure, NCVD-PCI Registry, 2007 – 2014

Planned duration of dual antiplatelet therapy in left main stem procedure (months)	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
1	29	3.9	4	1.9	13	4.2	17	3.1
3	23	3.1	3	1.3	3	0.9	6	1.1
6	23	3.1	3	1.3	9	2.8	12	2.2
12	442	59.0	179	80.3	278	87.4	457	84.5
> 12	189	25.2	25	11.2	1	0.3	26	4.8
Not available	31	4.1	8	3.6	13	4.1	21	3.9
Missing	12	1.6	1	0.4	1	0.3	2	0.4
Total	749	100.0	223	100.0	318	100.0	541	100.0

PCI to the grafts

From 2013 to 2014, a total of 166 bypass graft PCIs were performed; 89.7% were on SVG, 9.1% on LIMA and the rest were on radial grafts. [Table 4.22] Most graft PCIs were de novo lesions (89.2%), but there was a slightly higher incidence of in-stent restenosis (10.8% in 2013 – 2014 vs. 9.0% in 2007 – 2012). [Table 4.21]

The mean lesion length was 20.1 mm with a TIMI III flow in only 25.9% of lesions. [Table 4.22] Most of the lesions were stented with a DES (63.9%), followed by DEB (15.7%), BMS (12.0%), and POBA only (6%); embolic protection device was used in only 8.4%. [Table 4.22 and Table 4.23]

When compared to the 2007 – 2012 cohort, the use of DEB in graft PCI had significantly increased in 2013 – 2014 (9.8% vs. 15.7%); however, the use of embolic protection device reduced (20.0% vs. 8.4%). [Table 4.22 and Table 4.23] Successful PCI with TIMI III flow was achieved in 92.2%, with a mean stent length and diameter of 24.5 mm (SD 13.3 mm) and 3.0 mm (SD 0.6 mm), respectively. [Table 4.22] No major complications were reported. [Table 4.24]

Long term DAPT was still the preferred choice, with 83.1% receiving DAPT for 12 months. [Table 4.25]

Table 4.21 Lesion types in graft PCI, NCVD-PCI Registry, 2007 – 2014

Lesion type in graft PCI	2007 – 2012 Total no. of lesions = 481		2013 Total no. of lesions = 75		2014 Total no. of lesions = 91		2013 – 2014 Total no. of lesions = 166	
	No.	%	No.	%	No.	%	No.	%
De novo	428	89.0	66	88.0	82	90.1	148	89.2
Restenosis (no prior stent)	4	0.8	0	0	0	0	0	0
Stent thrombosis	0	0	0	0	0	0	0	0
In-stent restenosis	43	9.0	9	12.0	9	9.9	18	10.8
Not available	3	0.6	0	0	0	0	0	0
Missing	3	0.6	0	0	0	0	0	0
Total	481	100.0	75	100.0	91	100.0	166	100.0

Table 4.22 Clinical presentation of graft PCI, NCVD-PCI Registry, 2007 – 2014

	2007 – 2012 Total no. of lesions = 481		2013 Total no. of lesions = 75		2014 Total no. of lesions = 91		2013 – 2014 Total no. of lesions = 166	
	No.	%	No.	%	No.	%	No.	%
Graft, No. (%)								
18 LIMA	51	10.6	5	6.7	10	11.0	15	9.1
19 RIMA	3	0.6	0	0	0	0	0	0
20 SVG1	343	71.3	63	84.1	72	79.1	135	81.3
21 SVG2	61	12.7	4	5.3	7	7.7	11	6.6
22 SVG3	19	4.0	1	1.3	2	2.2	3	1.8
23 RAD1	3	0.6	1	1.3	0	0	1	0.6
24 RAD2	0	0	0	0	0	0	0	0
25 RAD3	1	0.2	1	1.3	0	0	1	0.6
Pre-procedure stenosis %								
N	445		67		83		150	
Mean (SD)	84.0 (12.4)		87.4 (11.3)		85.2 (11.0)		86.2 (11.1)	
Median (min, max)	90.0 (20.0, 100.0)		90.0 (50.0, 100.0)		85.0 (60.0, 100.0)		90.0 (50.0, 100.0)	
Missing, No. (%)	36	7.5	8	10.7	8	8.8	16	9.6
Post-procedure stenosis %								
N	418		68		86		154	
Mean (SD)	2.7 (13.0)		2.1 (12.3)		5.3 (20.5)		3.9 (17.4)	
Median (min, max)	0.0 (0.0, 100.0)		0.0 (0.0, 99.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)	
Missing, No. (%)	63	13.1	7	9.3	5	5.5	12	7.2
Estimated lesion length, mm								
N	436		71		83		154	
Mean (SD)	19.8 (12.0)		19.6 (14.7)		20.5 (10.9)		20.1 (12.7)	
Median (min, max)	16.0 (5.0, 90.0)		14.0 (5.0, 90.0)		17.0 (5.0, 72.0)		16.0 (5.0, 90.0)	
Missing, No. (%)	45	9.4	4	5.3	8	8.8	12	7.2
Lesion result, No. (%)								
Successful	469	97.5	74	98.7	87	95.6	161	97.0
Unsuccessful	10	2.1	1	1.3	4	4.4	5	3.0
Not available	0	0	0	0	0	0	0	0
Missing	2	0.4	0	0	0	0	0	0

	2007 – 2012 Total no. of lesions = 481		2013 Total no. of lesions = 75		2014 Total no. of lesions = 91		2013 – 2014 Total no. of lesions = 166	
	No.	%	No.	%	No.	%	No.	%
*Stent length, mm								
N	408		70		85		155	
Mean (SD)	25.5 (15.3)		23.8 (14.9)		25.2 (11.9)		24.5 (13.3)	
Median (min, max)	18.0 (8.0, 127.0)		18.0 (9.0, 98.0)		22.0 (10.0, 80.0)		20.0 (9.0, 98.0)	
Not available, No. (%)	73	15.2	5	6.7	6	6.6	11	6.6
**Stent diameter, mm								
N	406		70		85		155	
Mean (SD)	3.1 (0.6)		3.0 (0.6)		3.1 (0.6)		3.0 (0.6)	
Median (min, max)	3.0 (2.3, 7.0)		3.0 (2.3, 4.5)		3.0 (2.0, 4.5)		3.0 (2.0, 4.5)	
Not available, No. (%)	75	15.6	5	6.7	6	6.6	11	6.6
#Other intracoronary devices used, No. (%)								
Aspiration/aspiration catheter	17	3.5	6	8.0	3	3.3	9	5.4
Balloon only/POBA	32	6.7	6	8.0	4	4.4	10	6.0
Drug-eluting balloon	47	9.8	8	10.7	18	19.8	26	15.7
Drug-eluting stent	278	57.8	48	64.0	58	63.7	106	63.9
Cutting balloon/scoring balloon	6	1.2	1	1.3	1	1.1	2	1.2
Coil			0	0	0	0	0	0
OCT			1	1.3	0	0	1	0.6
Mother and child			0	0	1	1.1	1	0.6
Micro catheter			2	2.7	2	2.2	4	2.4
Angiojet			0	0	0	0	0	0
IVUS	9	1.9	2	2.7	0	0	2	1.2
Flowire/FFR	2	0.4	0	0	0	0	0	0
Rotablator	0	0	1	1.3	0	0	1	0.6
Bare metal stent	119	24.7	15	20.0	5	5.5	20	12.0
Embolic protection	96	20.0	8	10.7	6	6.6	14	8.4
Others	25	5.2	4	5.3	0	0	4	2.4
Embolic protection status, No. (%)								
Filter	91	97.8	1	100	5	100	6	100
Balloon/distal	2	2.2	0	0	0	0	0	0
Proximal	0	0	0	0	0	0	0	0
Not available	0		7		1		8	
Missing	3		0		0		0	

	2007 – 2012 Total no. of lesions = 481		2013 Total no. of lesions = 75		2014 Total no. of lesions = 91		2013 – 2014 Total no. of lesions = 166	
	No.	%	No.	%	No.	%	No.	%
Direct stenting, No. (%)								
Yes	78	16.2	10	13.3	9	9.9	19	11.4
No	392	81.5	64	85.4	82	90.1	146	88.0
Not applicable	10	2.1	1	1.3	0	0	1	0.6
Missing	1	0.2	0	0	0	0	0	0

#Patients were allowed to be in more than one type of category

**Summation of stent length was used for lesions which were treated with more than one stent*

***Average of stent diameter was used for lesions which were treated with more than one stent*

Table 4.23 Types of stents used in graft PCI, NCVD-PCI Registry, 2007 – 2014

Types of stent used in graft PCI	2007 – 2012 Total no. of stents used = 579		2013 Total no. of stents used = 450		2014 Total no. of stents used = 546		2013 – 2014 Total no. of stents used = 996	
	No.	%	No.	%	No.	%	No.	%
Drug-eluting stent (DES)	348	60.1	57	12.7	69	12.6	126	12.7
Bare metal stent (BMS)	143	24.7	18	4.0	6	1.1	24	2.4
Bio-absorbable stent	0	0	1	0.2	0	0	1	0.1
Antibody-coated stent	10	1.7	0	0	0	0	0	0
Others	6	1.0	0	0	0	0	0	0
Drug-eluting balloon	0	0	8	1.8	18	3.3	26	2.6
Bifurcated stent	0	0	0	0	0	0	0	0
Covered stent	0	0	0	0	2	0.4	2	0.2
Combo stent	0	0	4	0.9	7	1.3	11	1.1
Missing	72	12.5	362	80.4	444	81.3	806	80.9
Total	579	100.0	450	100.0	546	100.0	996	100.0

**Stents which were not listed in the NCVD-PCI Stent List*

Table 4.24 Types of complications in graft PCI, NCVD-PCI Registry, 2007 – 2014

Types of complications	2007 – 2012 Total no. of lesions = 481		2013 Total no. of lesions = 75		2014 Total no. of lesions = 91		2013 – 2014 Total no. of lesions = 166	
	No.	%	No.	%	No.	%	No.	%
Dissection	8	1.7	1	1.3	0	0	1	0.6
<i>Flow limiting</i>			0	0	0	0	0	0
<i>Non-flow limiting</i>			1	100	0	0	1	100
<i>Not available</i>			0		0		0	
<i>Missing</i>			0		0		0	
No reflow	4	0.8	0		0		0	
<i>Transient</i>	3	75.0						
<i>Persistent</i>	1	25.0						
<i>Not available</i>	0							
<i>Missing</i>	0							
Acute closure	1	0.2						
Perforation	1	0.2	0		0		0	

#Patients were allowed to be in more than one type of category

Table 4.25 Planned duration of dual antiplatelet therapy in graft PCI, NCVD-PCI Registry, 2007 – 2014

Planned duration of dual antiplatelet therapy in graft PCI (months)	2007 – 2012 Total no. of lesions = 481		2013 Total no. of lesions = 75		2014 Total no. of lesions = 91		2013 – 2014 Total no. of lesions = 166	
	No.	%	No.	%	No.	%	No.	%
1	52	10.8	6	8.1	1	1.1	7	4.2
3	24	5.0	4	5.3	4	4.4	8	4.8
6	36	7.5	2	2.7	3	3.3	5	3.1
12	301	62.6	58	77.3	80	87.9	138	83.1
> 12	30	6.2	4	5.3	0	0	4	2.4
Not available	20	4.2	0	0	3	3.3	3	1.8
Missing	18	3.7	1	1.3	0	0	1	0.6
Total	481	100	75	100	91	100	166	100

PCI of chronic total occlusion (> 3 months)

From 2013 – 2014, a total of 1285 chronic total occlusions > 3 months were noted; out of which 90.5% were elective and 9.5% presented with ACS (STEMI-3.0%, NSTEMI/UA-6.5%). [Table 4.27]

Majority of the CTO lesions involved left anterior descending artery (42.6%), followed by right coronary artery (40.6%), and left circumflex artery (14.9%); 95.3% were de novo lesions and 4.0% were in-stent restenosis CTO. [Table 4.26]

Entry site, guide catheter size and closure device

Approximately half of the CTO PCI was performed via radial approach. However, in the past, only 34.2% used the radial approach. [Table 4.27] A 6 French guide catheter was used in 83% of cases, 7 French in 15.7% and 8 French in 1%. Around 25% of access was closed using closure devices. [Table 4.27]

Types of stents and devices used

Drug-eluting stents were used more frequently in CTO lesions (65.8%), followed by POBA in only 13.8%, DEB in 9.2% and BMS in 4.6%. [Table 4.28 and Table 4.29] The use of adjunctive devices such as IVUS (5.1%), Rotablator (1.5%), cutting balloon (1.2%), and OCT (0.9%) were uncommon. [Table 4.29]

Results and complications

Out of 1285 lesions, the mean length of the CTO was 42 mm (SD 23.6), and 78.1% of lesions were successfully treated with PCI. The mean stent length and diameter were 49 mm (SD 25.6) and 2.8 mm (SD 0.4%), respectively. [Table 4.28] No major complications were observed; dissection was noted in 4.3% and perforation in 0.9%. [Table 4.30] Majority of them received standard DAPT for 12 months. There was no significant difference observed when compared to the 2007 – 2012 data. [Table 4.31]

Table 4.26 Summary of location of lesions treated with percutaneous coronary intervention and for lesion with description of CTO > 3 months only, NCVD-PCI Registry, 2007 – 2014

Location of lesion with CTO > 3 mo	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
None	0	0	0	0	0	0	0	0
Left main stem	32	1.2	12	2.2	9	1.2	21	1.7
Left anterior descending artery (LAD)	1207	46.0	242	44.0	305	41.5	547	42.6
LAD proximal	940	35.8	177	32.2	236	32.1	413	32.2
LAD mid	239	9.1	61	11.1	64	8.7	125	9.7
LAD distal	13	0.5	3	0.5	3	0.4	6	0.5
D1	15	0.6	1	0.2	2	0.3	3	0.2
D2	0	0	0	0	0	0	0	0
D3	0	0	0	0	0	0	0	0
Right coronary artery (RCA)	1024	39.0	219	39.7	303	41.2	522	40.6
RCA proximal	591	22.5	112	20.4	168	22.9	280	21.9
RCA mid	288	11.0	75	13.6	87	11.8	162	12.6
RCA distal	113	4.3	25	4.5	41	5.6	66	5.1
PDA	15	0.6	4	0.7	3	0.4	7	0.5
PLV	17	0.6	3	0.5	4	0.5	7	0.5
Left circumflex artery (LCx)	340	12.9	76	13.9	116	15.8	192	14.9
LCX proximal	183	7.0	40	7.3	69	9.4	109	8.5
LCX distal	102	3.9	24	4.4	29	3.9	53	4.1
OM1	43	1.6	11	2.0	16	2.2	27	2.1
OM2	9	0.3	1	0.2	2	0.3	3	0.2
OM3	3	0.1	0	0	0	0	0	0
Graft	23	0.9	1	0.2	2	0.3	3	0.2
LIMA	3	0.1	0	0	0	0	0	0
RIMA	0	0	0	0	0	0	0	0
SVG1	15	0.6	1	0.2	2	0.3	3	0.2
SVG2	3	0.1	0	0	0	0	0	0
SVG3	2	0.1	0	0	0	0	0	0
RAD1	0	0	0	0	0	0	0	0
RAD2	0	0	0	0	0	0	0	0
RAD3	0	0	0	0	0	0	0	0
Missing			0	0	0	0	0	0

Table 4.27 Characteristics of PCI procedures performed for lesion with description of CTO > 3 months only, NCVD-PCI Registry, 2007 – 2014

	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
PCI status, No. (%)								
Elective	2461	93.7	510	92.7	653	88.9	1163	90.5
NSTEMI/UA	95	3.6	29	5.3	54	7.3	83	6.5
AMI/STEMI	68	2.6	11	2.0	28	3.8	39	3.0
Not available	0	0	0	0	0	0	0	0
Missing	2	0.1	0	0	0	0	0	0
Elective, No. (%)								
Staged PCI			217	42.8	329	50.5	546	47.2
Ad hoc			290	57.2	322	49.5	612	52.8
Not available			3		2		5	
Missing			0		0		0	
NSTEMI/UA, No. (%)								
Urgent			6	20.7	11	20.4	17	20.5
Non-urgent			23	79.3	43	79.6	66	79.5
Not available			0		0		0	
Missing			0		0		0	
STEMI, No. (%)								
Rescue			4	36.3	8	28.5	12	30.7
Primary			5	45.5	14	50.0	19	48.7
Facilitated			0	0	0	0	0	0
Delayed PCI			0	0	0	0	0	0
Delayed routine PCI			0	0	4	14.3	4	10.3
Delayed selective PCI			2	18.2	1	3.6	3	7.7
Pharmacoinvasive			0	0	1	3.6	1	2.6
Not available			0		0		0	
Missing			0		0		0	
[#] Percutaneous entry, No. (%)								
Brachial	29	1.1	6	1.1	5	0.7	11	0.9
Radial	899	34.2	270	49.1	367	49.9	637	49.6
Femoral	1606	61.2	324	58.9	474	64.5	798	62.1
^{S^} French size type								
Guiding catheter			521	94.8	702	95.5	1223	95.2
Guiding sheath			16	2.9	30	4.1	46	3.5
Not available			3	0.5	3	0.4	6	0.5
Missing			10	1.8	0	0	10	0.8

	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
^French size (guiding catheter), No. (%)								
4			0	0	0	0	0	0
5	32	1.2	1	0.2	0	0	1	0.1
6	1863	80.0	420	80.6	595	84.8	1015	83.0
7	616	23.5	90	17.3	102	14.5	192	15.7
8	30	1.1	8	1.5	4	0.6	12	1.0
9	0	0	0	0	0	0	0	0
Others	1	0.0	0	0	0	0	0	0
Not available	30	1.1	2	0.4	1	0.1	3	0.2
Missing	54	2.1	0	0	0	0	0	0
Closure device, No. (%)								
No	2383	90.7	459	83.4	515	70.1	974	75.7
Seal	74	2.8	18	3.3	44	5.9	62	4.8
Suture	31	1.2	22	4.0	61	8.3	83	6.5
Exoseal			12	2.2	21	2.9	33	2.6
Others	4	0.2	8	1.5	39	5.3	47	3.7
Not available	27	1.0	4	0.7	5	0.7	9	0.7
Missing	107	4.1	27	4.9	50	6.8	77	6.0
#^ Extent of coronary disease, No. (%)								
Single vessel disease	1094	41.7	310	56.4	501	68.2	811	63.1
Multiple vessel disease	1329	50.6	209	38.0	204	27.8	413	32.1
Graft	24	0.9	13	2.4	21	2.8	34	2.7
Left main	12	0.5	3	0.5	8	1.1	11	0.9
Not available			15	2.7	1	0.1	16	1.2
Fluoroscopy time, min								
N	2304		469		635		1104	
Mean (SD)	31.8 (21.7)		38.2 (24.6)		34.2 (22.6)		35.9 (23.6)	
Median (min, max)	26.8 (2.0, 178.0)		32.2 (2.5, 158.0)		29.4 (2.8, 148.5)		30.4 (2.5, 158.0)	
Not available, No. (%)	214	8.1	52	9.5	68	9.3	120	9.3
Missing, No. (%)	108	4.1	29	5.3	32	4.4	61	4.7
Fluoroscopy total dose, mGy								
N	1334		243		410		653	
Mean (SD)	4639.4 (44865.7)		32789.6 (104878.4)		68879.4 (148477.4)		55449.3 (134968.9)	
Median (min, max)	280.0 (0.9, 1199417.0)		2456.0 (1.6, 710958.0)		3457.5 (5.4, 1082615.0)		2988.0 (1.6, 1082615.0)	
Not available, No. (%)	982	37.4	205	37.3	206	28.0	411	32.0
Missing, No. (%)	310	11.8	102	18.5	119	16.2	221	17.2

	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
Contrast type, No. (%)								
Ionic	19	0.7	0	0	0	0	0	0
Non-ionic	2391	91.1	113	20.6	0	0	113	8.8
Not available	173	6.6	5	0.9	1	0.1	6	0.5
Missing	43	1.6	432	78.5	734	99.9	1166	90.7
Contrast volume, ml								
N	2374		464		624		1088	
Mean (SD)	217.9 (85.8)		223.8 (90.1)		209.7 (90.5)		215.7 (90.6)	
Median (min, max)	200.0 (18.0, 500.0)		200.0 (27.0, 500.0)		200.0 (26.0, 500.0)		200.0 (26.0, 500.0)	
Not available, No. (%)	194	7.4	56	10.2	65	8.8	121	9.4
Missing, No. (%)	58	2.2	30	5.5	46	6.3	76	5.9
Thrombolytics prior to PCI procedure in STEMI, No. (%)								
<i>Total no. of procedures among STEMI patients</i>	479	100	18	100	61	100	79	100
Yes	35	7.3	4	22.2	16	26.2	20	25.3
No	444	92.7	14	77.8	45	73.8	59	74.7
Missing	0	0	0	0	0	0	0	0

[#]Patients are allowed to be in more than one type of category

[§]French size type was not available in the old CRF. In the old CRF, information on French size was only collected for guiding catheter.

[^]French size is reported by number of lesions instead of number of procedures. In the old CRF, French size was reported under Section 6 cath lab visit, no 6b, whereas in the new CRF, it was reported under Section 7 PCI proc details, no 11.

^{*}In the new CRF, French size 9 is not listed. However, there is one patient with guiding catheter and French size 9 and three patients with gyuiding sheath and French size 9.

^{xx}Results as presented differently in 2007 – 2012 and 2013 – 2014. In 2007 – 2012, patients are allowed to be presented in different categories. In 2013 – 2014, patients are included in a unique category.

- Single vessel disease is for patients with single vessel disease information (old CRF)/ patients with only one information of either LAD, LCx or RCA.
- Multiple vessel disease is for patients with multiple vessel disease information (old CRF)/patients with more than one information of LAD, LCx or RCA.
- Left main stem (LMS) is for patients with information of LMS (LMS alone or combination with LAD, LCx, RCA or single vessel disease)

Graft is for patients with information of graft (graft alone or combination with LAD, LCx, RCA, single vessel disease, multiple vessel disease or LMS)

	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
Pre-procedure stenosis %								
N	2572		526		722		1248	
Mean (SD)	97.8 (9.5)		99.3 (5.3)		97.9 (9.8)		98.5 (8.2)	
Median (min, max)	100.0 (0.0, 100.0)		100.0 (9.0, 100.0)		100.0 (0.0, 100.0)		100.0 (0.0, 100.0)	
Missing, No. (%)	54	2.1	24	4.4	13	1.8	37	2.9
Post-procedure stenosis %								
N	2459		513		704		1217	
Mean (SD)	20.2 (39.1)		22.9 (41.2)		22.6 (41.2)		22.7 (41.2)	
Median (min, max)	0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)	
Missing, No. (%)	167	6.4	37	6.7	31	4.2	68	5.3
Estimated lesion length, mm								
N	2221		435		600		1035	
Mean (SD)	35.1 (21.1)		43.0 (24.4)		41.3 (23.0)		42.0 (23.6)	
Median (min, max)	30.0 (5.0, 140.0)		38.0 (8.0, 128.0)		37.5 (4.0, 130.0)		38.0 (4.0, 130.0)	
Missing, No. (%)	405	15.4	115	20.9	135	18.4	250	19.5
Lesion result, No. (%)								
Successful	2107	80.2	430	78.2	573	78.0	1003	78.1
Unsuccessful	512	19.5	120	21.8	160	21.7	280	21.7
Not available	3	0.1	0	0	2	0.3	2	0.2
Missing	4	0.2	0	0	0	0	0	0
*Stent length, mm								
N	1949		407		561		968	
Mean (SD)	45.1 (24.2)		51.2 (25.3)		47.3 (25.7)		49.0 (25.6)	
Median (min, max)	38.0 (8.0, 152.0)		48.0 (12.0, 132.0)		40.0 (8.0, 167.0)		44.0 (8.0, 167.0)	
Not available, No. (%)	677	25.8	143	26.0	174	23.7	317	24.7
**Stent diameter, mm								
N	1947		407		558		965	
Mean (SD)	2.8 (0.4)		2.8 (0.4)		2.8 (0.4)		2.8 (0.4)	
Median (min, max)	2.8 (2.0, 4.7)		2.8 (2.0, 4.0)		2.8 (2.0, 4.0)		2.8 (2.0, 4.0)	
Not available, No. (%)	679	25.9	143	26.0	177	24.1	320	24.9
Maximum balloon size used, mm								
N	2132		422		583		1005	
Mean (SD)	2.9 (0.6)		2.9 (0.6)		2.9 (0.6)		2.9 (0.6)	
Median (min, max)	3.0 (1.0, 5.0)		3.0 (1.2, 4.5)		3.0 (1.0, 5.0)		3.0 (1.0, 5.0)	
Missing, No. (%)	494	18.8	128	23.3	152	20.7	280	21.8

	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
Maximum stent/balloon deploy pressure, atm								
N	2051		414		572		986	
Mean (SD)	16.3 (4.1)		16.8 (4.3)		16.5 (4.8)		16.6 (4.6)	
Median (min, max)	16.0 (4.0, 30.0)		16.0 (4.0, 30.0)		16.0 (2.0, 34.0)		16.0 (2.0, 34.0)	
Missing, No. (%)	575	21.9	136	24.7	163	22.2	299	23.3

#Patients were allowed to be in more than one type of category

*Summation of stent length was used for lesions which were treated with more than one stent

**Average of stent diameter was used for lesions which were treated with more than one stent

Table 4.28 Types of stents used for lesion with description of CTO > 3 months only, NCVD-PCI Registry, 2007 – 2014

Types of stents for lesion with CTO > 3 mo	2007 – 2012 Total no. of stents used = 4016		2013 Total no. of stents used = 757		2014 Total no. of stents used = 952		2013 – 2014 Total no. of stents = 1709	
	No.	%	No.	%	No.	%	No.	%
Drug-eluting stent	2767	68.9	638	84.3	786	82.6	1424	83.3
Bare metal stent	472	11.8	34	4.5	33	3.5	67	3.9
Bio-absorbable stent	1	0	4	0.5	9	0.9	13	0.8
Antibody-coated	35	0.9	1	0.1	0	0	1	0.1
Others	77	1.9	8	1.1	13	1.4	21	1.2
Drug-eluting balloon	0	0	60	7.9	87	9.1	147	8.6
Bifurcated stent	0	0	0	0	2	0.2	2	0.1
Covered stent	1	0	0	0	1	0.1	1	0.1
Combo stent	0	0	8	1.1	21	2.2	29	1.7
Missing	663	16.5	4	0.5	0	0	4	0.2
Total	4016	100.0	757	100.0	952	100.0	1709	100.0

*Stents which were not listed in the NCVD-PCI Stent List

Table 4.29 Types of devices used during percutaneous coronary intervention for lesion with description of CTO > 3 months only, NCVD-PCI Registry, 2007 – 2014

#Intracoronary devices used for lesion with CTO > 3 mo	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
Aspiration/aspiration catheter	50	1.9	10	1.8	10	1.4	20	1.6
Balloon only/POBA	214	8.1	69	12.5	108	14.7	177	13.8
Drug-eluting balloon	138	5.3	49	8.9	69	9.4	118	9.2
Drug-eluting stent	1626	61.9	365	66.4	480	65.3	845	65.8
Cutting balloon/scoring balloon	26	1.0	8	1.5	8	1.1	16	1.2
Coil			5	0.9	0	0	5	0.4
OCT			6	1.1	5	0.7	11	0.9
Mother and child			3	0.5	3	0.4	6	0.5
Micro catheter			188	34.2	279	38.0	467	36.3
Angiojet			0	0	0	0	0	0
IVUS	113	4.3	38	6.9	28	3.8	66	5.1
Flowire/FFR	27	1.0	4	0.7	3	0.4	7	0.5
Rotablator	24	0.9	10	1.8	9	1.2	19	1.5
Bare metal stent	338	12.9	31	5.6	28	3.8	59	4.6
Embolic protection	8	0.3	1	0.2	0	0	1	0.1
Filter			0	0	0	0	0	0
Balloon/distal			0	0	0	0	0	0
Proximal			0	0	0	0	0	0
Missing			1		0		1	
Others	504	19.2	103	18.7	42	5.7	145	11.3

#Patients were allowed to be in more than one type of category

Table 4.30 Types of post procedure complications for lesion with description of CTO > 3 months only, NCVD-PCI Registry, 2007 – 2014

*Types of complication for lesion with CTO > 3 mo	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
Dissection	159	6.1	27	4.9	28	3.8	55	4.3
Flow limiting			2	8.0	2	7.4	4	7.7
Non-flow limiting			23	92.0	25	92.6	48	92.3
Not available			1		1		2	
Missing			1		0		1	
No reflow	55	2.1	10	1.8	6	0.8	16	1.2
Transient	26	56.5	4	40.0	1	20.0	5	33.3
Persistent	20	43.5	6	60.0	4	80.0	10	66.7
Not available	6		0		1		1	
Missing	3		0		0		0	
Acute closure	8	0.3						
Perforation	22	0.8	7	1.3	5	0.7	12	0.9

*Results are only showed for patients who were reported to have the complications

Table 4.31 Duration of thienopyridine in patients who underwent PCI and lesion with description of CTO > 3 months only, NCVI-PCI Registry, 2007 – 2014

Year	Duration of clopidogrel/ticlopidine (months)	#Intracoronary devices used					
		Balloon only/POBA		Drug-eluting stent		Bare metal stent	
		No.	%	No.	%	No.	%
2007 – 2012 Total no. of lesions = 2626	1	42	19.6	16	1.0	111	32.8
	3	19	8.9	12	0.7	24	7.1
	6	15	7.0	91	5.6	41	12.1
	12	73	34.1	1273	78.3	126	37.3
	> 12	12	5.6	165	10.1	13	3.8
	Not available	50	23.4	37	2.3	10	3.1
	Missing	3	1.4	32	2.0	13	3.8
	Total	214	100.0	1626	100.0	338	100.0
2013 Total no. of lesions = 550	1	9	13.1	2	0.5	11	35.5
	3	5	7.2	1	0.3	1	3.2
	6	1	1.4	6	1.6	1	3.2
	12	42	60.9	338	92.7	14	45.2
	> 12	0	0	8	2.2	1	3.2
	Not available	10	14.5	7	1.9	2	6.5
	Missing	2	2.9	3	0.8	1	3.2
	Total	69	100.0	365	100.0	31	100.0
2014 Total no. of lesions = 735	1	15	13.8	3	0.6	4	14.3
	3	2	1.9	5	1.0	0	0
	6	4	3.7	7	1.5	2	7.1
	12	66	61.1	446	92.9	19	67.9
	> 12	5	4.6	9	1.9	1	3.6
	Not available	14	13.0	4	0.8	2	7.1
	Missing	2	1.9	6	1.3	0	0
	Total	108	100.0	480	100.0	28	100.0
2013 – 2014 Total no. of lesions = 1285	1	24	13.5	5	0.6	15	25.4
	3	7	4.0	6	0.7	1	1.7
	6	5	2.8	13	1.5	3	5.1
	12	108	61.0	784	92.8	33	55.9
	> 12	5	2.8	17	2.0	2	3.4
	Not available	24	13.6	11	1.3	4	6.8
	Missing	4	2.3	9	1.1	1	1.7
	Total	177	100.0	845	100.0	59	100.0

#Patients were allowed to be in more than one type of category

OUTCOME

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Summary

1. Overall in-hospital mortality in the period of 2007 – 2014 was low at 2.0%; at 30 days, mortality was 2.3% and at 1 year, mortality was 3.75%. Mortality increased for the years 2013 – 2014 (2.3%) compared to 2007 – 2012 (1.5%) due to the increase in ACS patients.
2. Incidences of periprocedural complications were low (0 – 0.8%).
3. Mortality prognosticators were being elderly, clinical presentation (Killip Class III/IV and low EF), status of PCI (urgent > elective) and renal impairment. Being female and having diabetes appeared to cause higher but not statistically significant mortality. Patients with high cholesterol and higher blood pressure at presentation appeared to have lower (but statistically not significant) mortality.

There is an increasing trend of mortality in the present cohort for in-hospital mortality and at 30 days. In-hospital mortality for 2007 – 2012 was 1.5% vs. 2.3% in 2013 – 2014; mortality at 30 days for 2007 – 2012 was 2.0% vs. 2.7% in 2013 – 2014. At one year, no difference in mortality between the two cohorts (3.9% vs. 3.5%) was seen [Table 5.2]

In the 2013 – 2014 cohort, mortality within one year was mainly in-hospital (66%) vs. 38% in 2007 – 2012. Therefore, post discharge mortality had reduced in the last two years.

Most of the in-hospital deaths were cardiac related (78.2%); the rate decreased at follow-up (54% at one year). [Table 5.11]

In the ACS group, mortality was higher in STEMI > NSTEMI > UA. In the present cohort, mortality at discharge for STEMI was 8.1% vs. 4.6% in 2007 – 2012. For NSTEMI, mortality at discharge was 3.4% vs. 1.6% in 2007 – 2012. For UA, the mortality was similar between the two cohorts (1.2% vs. 1.1%). [Table 5.9]

The overall in-hospital complications were less than 2.0%: periprocedural MI (0.7%), cardiogenic shock (0.6%), stroke (0.1%) arrhythmia (0.8%), bleeding (0.2%, only two patients with major bleeding), and new renal impairment (0.5%). Emergency reintervention increased from 0.3% to 0.8%. Bail out CABG was extremely low, affecting only three patients in this cohort. [Table 5.1]

For elective PCI, in-hospital mortality (0.5% in 2007 – 2012 vs. 0.5% in 2013 – 2014) and 30-days mortality (0.9% in 2007 – 2012 vs. 0.8% in 2013 – 2014) were similar in both cohorts. For one year mortality, the present cohort seemed to have lower mortality (1.6%) compared to the previous cohort (2.8%). Non-elective PCI had higher in-hospital, 30-day and one year mortality. [Table 5.8]

In 2013 – 2014 cohort, mortality within one year was mainly in-hospital among non-elective (80%) vs. elective (31.3%). Similar trend was noted in 2007 – 2012, 78% vs. 18% among non-elective and elective respectively.

Higher mortality in elderly > middle age > young (2.5%, 1.3%, and 0.7% in 2010 – 2012 cohort), diabetes (1.8 vs. 1.3% non-DM), and female (2.1 vs. 1.7% in male). [Table 5.3, Table 5.4 and Table 5.5]

Comparison with other registries:

Table A Comparing in-hospital mortality with other registries

	Malaysia	Singapore	Thailand	China	Kerala	Jordan	UK
In-hospital mortality	1.5 – 2.3 %	0.3 – 0.4%	2.4% (< 75 yrs); 5.3% (≥ 75 yrs)	0.32%	0.4 – 0.5%	0.6%	1.6%

Table 5.1 Summary of in-hospital outcomes for patients who underwent PCI, NCVD-PCI Registry, 2007 – 2014

	2007 – 2012 Total no. of procedures = 26483		2013 Total no. of procedures = 6928		2014 Total no. of procedures = 8586		2013 – 2014 Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Periprocedural MI, No. (%) (based on clinical diagnosis)/ significant periprocedural MI, No. (%)								
Yes	109	0.4	34	0.5	71	0.8	105	0.7
No	26183	98.9	6818	98.4	8412	98	15230	98.2
Not available	90	0.3	26	0.4	42	0.5	68	0.4
Missing	101	0.4	50	0.7	61	0.7	111	0.7
Emergency reintervention/PCI, No. (%)								
Yes	68	0.3	44	0.6	72	0.8	116	0.8
No	26306	99.3	6834	98.7	8453	98.5	15287	98.5
Missing	109	0.4	50	0.7	61	0.7	111	0.7
Bail-out CABG, No. (%)								
Yes	8	0.0	1	0.0	2	0.0	3	0.0
No	26373	99.6	6877	99.3	8509	99.1	15386	99.2
Missing	102	0.4	50	0.7	75	0.9	125	0.8
Other complications								
Cardiogenic shock (after procedure), No. (%)								
Yes	112	0.4	44	0.6	49	0.6	93	0.6
No	26269	99.2	6835	98.7	8474	98.7	15309	98.7
Missing	102	0.4	49	0.7	63	0.7	112	0.7
Arrhythmia (VT/VF/Brady), No. (%)								
Yes	146	0.6	68	1.0	51	0.6	119	0.8
No	26235	99.1	6810	98.3	8473	98.7	15283	98.5
Missing	102	0.3	50	0.7	62	0.7	112	0.7
TIA/Stroke, No. (%)								
Yes	10	0.0	6	0.1	2	0.0	8	0.1
No	26372	99.6	6875	99.2	8524	99.3	15399	99.2
Missing	101	0.4	47	0.7	60	0.7	107	0.7

	2007 – 2012 Total no. of procedures = 26483		2013 Total no. of procedures = 6928		2014 Total no. of procedures = 8586		2013 – 2014 Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Tamponade, No. (%)								
Yes	17	0.0	0	0	2	0.0	2	0.0
No	26364	99.6	6877	99.3	8520	99.3	15397	99.3
Missing	102	0.4	51	0.7	64	0.7	115	0.7
Contrast reaction, No. (%)								
Yes	15	0.1	7	0.1	4	0.0	11	0.1
No	26363	99.5	6870	99.2	8520	99.3	15390	99.2
Missing	105	0.4	51	0.7	62	0.7	113	0.7
New onset/worsened heart failure, No. (%)								
Yes	21	0.1	14	0.2	11	0.1	25	0.2
No	26355	99.5	6864	99.1	8512	99.2	15376	99.1
Missing	107	0.4	50	0.7	63	0.7	113	0.7
New renal impairment, No. (%)								
Yes	49	0.2	48	0.7	33	0.4	81	0.5
No	26007	98.2	6821	98.5	8490	98.9	15311	98.7
Not available	321	1.2	10	0.1	2	0.0	12	0.1
Missing	106	0.4	49	0.7	61	0.7	110	0.7
Max post procedural rise in creatinine, No. (%)								
Yes	92	0.3						
No	25566	96.5						
Not available	625	2.4						
Missing	200	0.8						
Max post procedural rise in creatinine results, micromol/L								
N	92							
Mean (SD)	427.8(471.6)							
Median (min, max)	355.0(85.0, 4190.0)							
Vascular complications								
Bleeding, No. (%)								
Yes	137	0.5	18	0.3	10	0.1	28	0.2
No	26212	99.0	6858	98.9	8515	99.2	15373	99.1
Missing	134	0.5	52	0.8	61	0.7	113	0.7

	2007 – 2012 Total no. of procedures = 26483		2013 Total no. of procedures = 6928		2014 Total no. of procedures = 8586		2013 – 2014 Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Type of bleeding, No. (%)								
Major	13	10.5	2	12.5	0	0	2	8.0
Minor	31	25.0	3	18.8	1	11.1	4	16.0
Minimal	80	64.5	11	68.7	8	88.9	19	76.0
Not available	9		2		0		2	
Missing	4		0		1		1	
Bleeding site, No. (%)								
Retroperitoneal	3	2.5	2	15.4	0	0	2	10.0
Percutaneous entry site	89	74.2	8	61.5	7	100	15	75.0
Others	28	23.3	3	23.1	0	0	3	15.0
Not available	9		5		2		7	
Missing	8		0		1		1	
Access site occlusion, No. (%)								
Yes	12	0.0	0	0	1	0.0	1	0.0
No	26327	99.5	6873	99.2	8521	99.3	15394	99.2
Missing	144	0.5	55	0.8	64	0.7	119	0.8
Loss of distal/radial pulse, No. (%)*								
Yes	2	0.0	0	0	1	0.0	1	0.0
No	26329	99.4	6875	99.2	8524	99.3	15399	99.3
Missing	152	0.6	53	0.8	61	0.7	114	0.7
Dissection, No. (%)								
Yes	37	0.1	4	0.1	3	0.0	7	0.0
No	26287	99.3	6870	99.1	8521	99.3	15391	99.3
Missing	159	0.6	54	0.8	62	0.7	116	0.7
Pseudoaneurysm, No. (%)								
Yes	17	0.1	4	0.1	8	0.1	12	0.1
No	26256	99.1	6863	99.1	8516	99.2	15379	99.1
Missing	210	0.8	61	0.8	62	0.7	123	0.8

	2007 – 2012 Total no. of procedures = 26483		2013 Total no. of procedures = 6928		2014 Total no. of procedures = 8586		2013 – 2014 Total no. of procedures = 15514	
	No.	%	No.	%	No.	%	No.	%
Management of pseudoaneurysm, No. (%)								
Ultrasound compression	5	41.7	2	66.7	2	40.0	4	50.0
Surgery	1	8.3	1	33.3	0	0	1	12.5
Others	6	50.0	0	0	3	60.0	3	37.5
Not available	4		1		2		3	
Missing	1		0		1		1	
Perforation, No. (%)								
Yes			1	0.0	0	0	1	0.0
No			5401	78.0	8412	98.0	13813	89.0
Missing			1526	22.0	174	2.0	1700	11.0

**In 2007 – 2012, information was collected for "loss of distal pulse" whereas in 2013 – 2014, information was collected for "loss of radial pulse"*

Table 5.2 Overall outcome of patients who underwent PCI, NCVI-PCI Registry, 2007 – 2014

Year	*Outcome	Overall outcome							
		Outcome at discharge		**30-day		***6-month		****1-year	
		No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of patients = 24459	Death	371	1.5	499	2.0	715	2.9	948	3.9
	Alive	24088	98.5	23960	98.0	23744	97.1	23511	96.1
	Total	24459	100.0	24459	100.0	24459	100.0	24459	100.0
2013 Total no. of patients = 6353	Death	136	2.1	172	2.7	211	3.3	250	3.9
	Alive	6217	97.9	6181	97.3	6142	96.7	6103	96.1
	Total	6353	100.0	6353	100.0	6353	100.0	6353	100.0
2014 Total no. of patients = 7783	Death	184	2.4	210	2.7	238	3.1	250	3.2
	Alive	7599	97.6	7573	97.3	7545	96.9	7533	96.8
	Total	7783	100	7783	100	7783	100	7783	100
2013 – 2014 Total no. of patients = 14136	Death	320	2.3	7783	2.7	449	3.2	500	3.5
	Alive	13816	97.7	7783	97.3	13687	96.8	13636	96.5
	Total	14136	100.0	7783	100.0	14136	100.0	14136	100.0

**The outcome data was derived based on National Death Register data*

***Including patients who died in-hospital*

****Including patients who died in-hospital and at 30 days*

*****Including patients who died in-hospital, at 30 days, and six months*

Note: Patients with the status "transferred to other centre", "lost to follow-up", "not available" and "missing" were categorised as "alive" patients

Table 5.3 Overall outcome for patients who underwent PCI, by age group (years), NCVD-PCI Registry, 2007 – 2014

Year	*Outcome	Outcome at discharge			**30-day			***6-month			****1-year		
		Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2007 – 2012 Total no. of patients = 24459	Death	5 (0.5)	148 (1.1)	218 (2.2)	10 (1.0)	196 (1.5)	293 (2.9)	15 (1.4)	286 (2.1)	414 (4.1)	22 (2.1)	376 (2.8)	550 (5.5)
	Alive	1037 (99.5)	13280 (98.9)	9771 (97.8)	1032 (99.0)	13232 (98.5)	9696 (97.1)	1027 (98.6)	13142 (97.9)	9575 (95.9)	1020 (97.9)	13052 (97.2)	9439 (94.5)
	Total	1042 (100.0)	13428 (100.0)	9989 (100.0)	1042 (100.0)	13428 (100.0)	9989 (100.0)	1042 (100.0)	13428 (100.0)	9989 (100.0)	1042 (100.0)	13428 (100.0)	9989 (100.0)
2013 Total no. of patients = 6353	Death	4 (1.3)	48 (1.4)	84 (3.3)	5 (1.6)	61 (1.8)	106 (4.1)	6 (1.9)	73 (2.1)	132 (5.1)	9 (2.8)	89 (2.6)	152 (5.9)
	Alive	315 (98.7)	3414 (98.6)	2488 (96.7)	314 (98.4)	3401 (98.2)	2466 (95.9)	313 (98.1)	3389 (97.9)	2440 (94.9)	310 (97.2)	3373 (97.4)	2420 (94.1)
	Total	319 (100.0)	3462 (100.0)	2572 (100.0)	319 (100.0)	3462 (100.0)	2572 (100.0)	319 (100.0)	3462 (100.0)	2572 (100.0)	319 (100.0)	3462 (100.0)	2572 (100.0)
2014 Total no. of patients = 7783	Death	5 (1.2)	78 (1.9)	101 (3.1)	6 (1.5)	87 (2.1)	117 (3.6)	6 (1.5)	96 (2.3)	136 (4.2)	7 (1.7)	100 (2.4)	143 (4.4)
	Alive	405 (98.8)	4024 (98.1)	3170 (96.9)	404 (98.5)	4015 (97.9)	3154 (96.4)	404 (98.5)	4006 (97.7)	3135 (95.8)	403 (98.3)	4002 (97.6)	3128 (95.6)
	Total	410 (100.0)	4102 (100.0)	3271 (100.0)	410 (100.0)	4102 (100.0)	3271 (100.0)	410 (100.0)	4102 (100.0)	3271 (100.0)	410 (100.0)	4102 (100.0)	3271 (100.0)
2013 – 2014 Total no. of patients = 14136	Death	9 (1.2)	126 (1.7)	185 (3.2)	11 (1.5)	148 (2.0)	223 (3.8)	12 (1.6)	169 (2.2)	268 (4.6)	16 (2.2)	189 (2.5)	295 (5.0)
	Alive	720 (98.8)	7438 (98.3)	5658 (96.8)	718 (98.5)	7416 (98.0)	5620 (96.2)	717 (98.4)	7395 (97.8)	5575 (95.4)	713 (97.8)	7375 (97.5)	5548 (95.0)
	Total	729 (100.0)	7564 (100.0)	5843 (100.0)	729 (100.0)	7564 (100.0)	5843 (100.0)	729 (100.0)	7564 (100.0)	5843 (100.0)	729 (100.0)	7564 (100.0)	5843 (100.0)

*The outcome data was derived based on National Death Register data

Including patients who died in-hospital, * Including patients who died in-hospital and at 30 days, ****Including patients who died in-hospital, at 30 days and at six months

Young is defined as age from 20 to less than 40 years, middle-aged is defined as age between 40 to less than 60 years, and elderly is defined as 60 years and above

Note: Patients with the status of "transferred to other centre", "lost to follow-up", "not available" and "missing" were categorised as "alive" patients

Table 5.4 Overall outcome of patients who underwent PCI, by gender, NCVD-PCI Registry, 2007 – 2014

Year	*Outcome	Outcome at discharge				**30-day				***6-month				****1-year			
		Male		Female		Male		Female		Male		Female		Male		Female	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of patients = 24459	Death	281	1.4	90	2.1	370	1.8	129	2.9	524	2.6	191	4.4	694	3.5	254	5.8
	Alive	19792	98.6	4296	97.9	19703	98.2	4257	97.1	19549	97.4	4195	95.6	19379	96.5	4132	94.2
	Total	20073	100.0	4386	100.0	20073	100.0	4386	100.0	20073	100.0	4386	100.0	20073	100.0	4386	100.0
2013 Total no. of patients = 6353	Death	95	1.8	41	3.9	126	2.4	46	4.3	156	2.9	55	5.2	189	3.6	61	5.7
	Alive	5195	98.2	1022	96.1	5164	97.6	1017	95.7	5134	97.1	1008	94.8	5101	96.4	1002	94.3
	Total	5290	100.0	1063	100.0	5290	100.0	1063	100.0	5290	100.0	1063	100.0	5290	100.0	1063	100.0
2014 Total no. of patients = 7783	Death	154	2.4	30	2.4	176	2.7	34	2.7	199	3.0	39	3.1	209	3.2	41	3.3
	Alive	6374	97.6	1225	97.6	6352	97.3	1221	97.3	6329	97.0	1216	96.9	6319	96.8	1214	96.7
	Total	6528	100.0	1255	100.0	6528	100.0	1255	100.0	6528	100.0	1255	100.0	6528	100.0	1255	100.0
2013 – 2014 Total no. of patients = 14136	Death	249	2.1	71	3.1	302	2.6	80	3.5	14	3.0	94	4.1	398	3.4	102	4.4
	Alive	11569	97.9	2247	96.9	11516	97.4	2238	96.5	11463	97.0	2224	95.9	11420	96.6	2216	95.6
	Total	11818	100.0	2318	100.0	11818	100.0	2318	100.0	11818	100.0	2318	100.0	11818	100.0	2318	100.0

*The outcome data was derived based on National Death Register data **Including patients who died in-hospital, ***Including patients who died in-hospital and at 30 days, ****Including patients who died in-hospital, at 30 days, and at six months

Note: Patients with the status of "transferred to other centre", "lost to follow-up", "not available" and "missing" were categorised as "alive" patient

Table 5.5 Overall outcome of patients who underwent PCI, by pre-morbid diabetes, NCVD-PCI Registry, 2007 – 2014

Year	*Outcome	Outcome at discharge			**30-day			***6-month			****1-year		
		Diabetic	Non-diabetic	Not known	Diabetic	Non-diabetic	Not known	Diabetic	Non-diabetic	Not known	Diabetic	Non-diabetic	Not known
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2013 Total no. of patients = 6353	Death	73 (2.7)	42 (1.3)	21 (5.4)	91 (3.3)	60 (1.9)	21 (5.4)	113 (4.1)	76 (2.4)	22 (5.7)	134 (4.9)	94 (2.9)	22 (5.7)
	Alive	2681 (97.3)	3171 (98.7)	365 (94.6)	2663 (96.7)	3153 (98.1)	365 (94.6)	2641 (95.9)	3137 (97.6)	364 (94.3)	2620 (95.1)	3119 (97.1)	364 (94.3)
	Total	2754 (100.0)	3213 (100.0)	386 (100.0)	2754 (100.0)	3213 (100.0)	386 (100.0)	2754 (100.0)	3213 (100.0)	386 (100.0)	2754 (100.0)	3213 (100.0)	386 (100.0)
2014 Total no. of patients = 7783	Death	79 (2.3)	69 (1.8)	36 (6.5)	90 (2.6)	80 (2.1)	40 (7.2)	103 (3.0)	93 (2.4)	42 (7.6)	109 (3.2)	98 (2.6)	43 (7.8)
	Alive	3325 (97.7)	3756 (98.2)	518 (93.5)	3314 (97.4)	3745 (97.9)	514 (92.8)	3301 (97.0)	3732 (97.6)	512 (92.4)	3295 (96.8)	3727 (97.4)	511 (92.2)
	Total	3404 (100.0)	3825 (100.0)	554 (100.0)	3404 (100.0)	3825 (100.0)	554 (100.0)	3404 (100.0)	3825 (100.0)	554 (100.0)	3404 (100.0)	3825 (100.0)	554 (100.0)

Year	*Outcome	Outcome at discharge				**30-day				***6-month				****1-year			
		Diabetic	Non-diabetic	Not known	Missing	Diabetic	Non-diabetic	Not known	Missing	Diabetic	Non-diabetic	Not known	Missing	Diabetic	Non-diabetic	Not known	Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2007 – 2012 Total no. of patients = 24459	Death	189 (1.7)	129 (1.0)	52 (8.4)	1 (4.5)	268 (2.4)	175 (1.4)	55 (8.9)	1 (4.5)	413 (3.7)	243 (1.9)	58 (9.4)	1 (4.5)	556 (5.0)	329 (2.6)	62 (10.1)	1 (4.5)
	Alive	10981 (98.3)	12522 (99.0)	564 (91.6)	21 (95.5)	10902 (97.6)	12476 (98.6)	561 (91.1)	21 (95.5)	10757 (96.3)	12408 (98.1)	558 (90.6)	21 (95.5)	10614 (95.0)	12322 (97.4)	554 (89.9)	21 (95.5)
	Total	11170 (100.0)	12651 (100.0)	616 (100.0)	22 (100.0)	11170 (100.0)	12651 (100.0)	616 (100.0)	22 (100.0)	11170 (100.0)	12651 (100.0)	616 (100.0)	22 (100.0)	11170 (100.0)	12651 (100.0)	616 (100.0)	22 (100.0)
2013 – 2014 Total no. of patients = 14136	Death	152 (2.5)	111 (1.6)	57 (6.1)	0 (0)	181 (2.9)	140 (2.0)	61 (6.5)	0 (0)	216 (3.5)	169 (2.4)	64 (6.8)	0 (0)	243 (3.9)	192 (2.7)	65 (6.9)	0 (0)
	Alive	6006 (97.5)	6927 (98.4)	883 (93.9)	0 (0)	5977 (97.1)	6898 (98.0)	879 (93.5)	0 (0)	5942 (96.5)	6869 (97.6)	876 (93.2)	0 (0)	5915 (96.1)	6846 (97.3)	875 (93.1)	0 (0)
	Total	6158 (100.0)	7038 (100.0)	940 (100.0)	0 (0)	6158 (100.0)	7038 (100.0)	940 (100.0)	0 (0)	6158 (100.0)	7038 (100.0)	940 (100.0)	0 (0)	6158 (100.0)	7038 (100.0)	940 (100.0)	0 (0)

*The outcome data was derived based on National Death Register data

** Including patients who died in-hospital, *** Including patients who died in-hospital and at 30 days, ****Including patients who died in-hospital, at 30 days, and at six months

Note: Patients with the status of "transferred to other centre", "lost to follow-up", "not available" and "missing" were categorised as "alive" patients

Table 5.6 Overall outcome of patients who underwent PCI, by pre-morbid hypertension, NCVD-PCI Registry, 2007 – 2014

Year	*Outcome	Outcome at discharge			**30-day			***6-month			****1-year		
		Hypertensive	Non-hypertensive	Not known	Hypertensive	Non-hypertensive	Not known	Hypertensive	Non-hypertensive	Not known	Hypertensive	Non-hypertensive	Not known
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2013 Total no. of patients = 6353	Death	93 (2.2)	25 (1.4)	18 (5.5)	122 (2.8)	32 (1.8)	18 (5.5)	152 (3.5)	39 (2.3)	20 (6.2)	183 (4.3)	46 (2.7)	21 (6.5)
	Alive	4202 (97.8)	1708 (98.6)	307 (94.5)	4173 (97.2)	1701 (98.2)	307 (94.5)	4143 (96.5)	1694 (97.7)	305 (93.8)	4112 (95.7)	1687 (97.3)	304 (93.5)
	Total	4295 (100.0)	1733 (100.0)	325 (100.0)	4295 (100.0)	1733 (100.0)	325 (100.0)	4295 (100.0)	1733 (100.0)	325 (100.0)	4295 (100.0)	1733 (100.0)	325 (100.0)
2014 Total no. of patients = 7783	Death	101 (1.9)	42 (2.0)	41 (8.6)	119 (2.3)	48 (2.3)	43 (9.1)	142 (2.7)	53 (2.5)	43 (9.1)	149 (2.9)	58 (2.7)	43 (9.1)
	Alive	5083 (98.1)	2082 (98.0)	434 (91.4)	5065 (97.7)	2076 (97.7)	432 (90.9)	5042 (97.3)	2071 (97.5)	432 (90.9)	5035 (97.1)	2066 (97.3)	432 (90.9)
	Total	5184 (100.0)	2124 (100.0)	475 (100.0)	5184 (100.0)	2124 (100.0)	475 (100.0)	5184 (100.0)	2124 (100.0)	475 (100.0)	5184 (100.0)	2124 (100.0)	475 (100.0)

Year	*Outcome	Outcome at discharge				**30-day				***6-month				****1-year			
		Hypertensive	Non-hypertensive	Not known	Missing	Hypertensive	Non-hypertensive	Not known	Missing	Hypertensive	Non-hypertensive	Not known	Missing	Hypertensive	Non-hypertensive	Not known	Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2007 – 2012 Total no. of patients = 24459	Death	250 (1.4)	74 (1.2)	47 (9.2)	0 (0)	347 (1.9)	104 (1.7)	48 (9.4)	0 (0)	527 (2.9)	139 (2.3)	49 (9.6)	0 (0)	717 (4.0)	180 (3.0)	51 (10.0)	0 (0)
	Alive	17647 (98.6)	5960 (98.8)	462 (90.8)	19 (100.0)	17550 (98.1)	5930 (98.3)	461 (90.6)	19 (100.0)	17370 (97.1)	5895 (97.7)	460 (90.4)	19 (100.0)	17180 (96.0)	5854 (97.0)	458 (90.0)	19 (100.0)
	Total	17897 (100.0)	6034 (100.0)	509 (100.0)	19 (100.0)	17897 (100.0)	6034 (100.0)	509 (100.0)	19 (100.0)	17897 (100.0)	6034 (100.0)	509 (100.0)	19 (100.0)	17897 (100.0)	6034 (100.0)	509 (100.0)	19 (100.0)
2013 – 2014 Total no. of patients = 14136	Death	194 (2.0)	67 (1.7)	59 (7.4)	0 (0)	241 (2.5)	80 (2.1)	61 (7.6)	0 (0)	294 (3.1)	92 (2.4)	63 (7.9)	0 (0)	332 (3.5)	104 (2.7)	64 (8.0)	0 (0)
	Alive	9285 (98.0)	3790 (98.3)	741 (92.6)	0 (0)	9238 (97.5)	3777 (97.9)	739 (92.4)	0 (0)	9185 (96.9)	3765 (97.6)	737 (92.1)	0 (0)	9147 (96.5)	3753 (97.3)	736 (92.0)	0 (0)
	Total	9479 (100.0)	3857 (100.0)	800 (100.0)	0 (0)	9479 (100.0)	3857 (100.0)	800 (100.0)	0 (0)	9479 (100.0)	3857 (100.0)	800 (100.0)	0 (0)	9479 (100.0)	3857 (100.0)	800 (100.0)	0 (0)

*The outcome data was derived based on National Death Register data

Including patients who died in-hospital, *Including patients who died in-hospital and at 30 days, ****Including patients who died in-hospital, at 30 days, and at six months

Note: Patients with the status of "transferred to other centre", "lost to follow-up", "not available" and "missing" were categorised as "alive" patients

Table 5.7 Overall outcome of patients who underwent PCI, by pre-morbid dyslipidaemia, NCVD-PCI Registry, 2007 – 2014

Year	*Outcome	Outcome at discharge			**30-day			***6-month			****1-year		
		Dyslipidaemic	Non-Dyslipidaemic	Not known	Dyslipidaemic	Non-dyslipidaemic	Not known	Dyslipidaemic	Non-Dyslipidaemic	Not known	Dyslipidaemic	Non-Dyslipidaemic	Not known
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2013 Total no. of patients = 6353	Death	47 (1.2)	54 (2.8)	35 (6.0)	74 (1.9)	62 (3.2)	36 (6.2)	100 (2.6)	74 (3.9)	37 (6.4)	125 (3.2)	87 (4.5)	38 (6.5)
	Alive	3807 (98.8)	1864 (97.2)	546 (94.0)	3780 (98.1)	1856 (96.8)	545 (93.8)	3754 (97.4)	1844 (96.1)	544 (93.6)	3729 (96.8)	1831 (95.5)	543 (93.5)
	Total	3854 (100.0)	1918 (100.0)	581 (100.0)	3854 (100.0)	1918 (100.0)	581 (100.0)	3854 (100.0)	1918 (100.0)	581 (100.0)	3854 (100.0)	1918 (100.0)	581 (100.0)
2014 Total no. of patients = 7783	Death	63 (1.4)	67 (2.8)	54 (7.4)	75 (1.6)	79 (3.2)	56 (7.7)	92 (2.0)	90 (3.7)	56 (7.7)	98 (2.1)	96 (3.9)	56 (7.7)
	Alive	4557 (98.6)	2366 (97.2)	676 (92.6)	4545 (98.4)	2354 (96.8)	674 (92.3)	4528 (98.0)	2343 (96.3)	674 (92.3)	4522 (97.9)	2337 (96.1)	674 (92.3)
	Total	4620 (100.0)	2433 (100.0)	730 (100.0)	4620 (100.0)	2433 (100.0)	730 (100.0)	4620 (100.0)	2433 (100.0)	730 (100.0)	4620 (100.0)	2433 (100.0)	730 (100.0)

Year	*Outcome	Outcome at discharge				**30-day				***6-month				****1-year			
		Dyslipidaemic	Non-dyslipidaemic	Not known	Missing	Dyslipidaemic	Non-dyslipidaemic	Not known	Missing	Dyslipidaemic	Non-Dyslipidaemic	Not known	Missing	Dyslipidaemic	Non-dyslipidaemic	Not known	Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2007 – 2012 Total no. of patients = 24459	Death	193 (1.1)	96 (1.7)	80 (7.0)	2 (5.0)	287 (1.6)	119 (2.1)	91 (8.0)	2 (5.0)	443 (2.5)	168 (3.0)	102 (8.9)	2 (5.0)	620 (3.5)	216 (3.8)	110 (9.6)	2 (5.0)
	Alive	17425 (98.9)	5562 (98.3)	1063 (93.0)	38 (95.0)	17331 (98.4)	5539 (97.9)	1052 (92.0)	38 (95.0)	17175 (97.5)	5490 (97.0)	1041 (91.1)	38 (95.0)	16998 (96.5)	5442 (96.2)	1033 (90.4)	38 (95.0)
	Total	17618 (100.0)	5658 (100.0)	1143 (100.0)	40 (100.0)	17618 (100.0)	5658 (100.0)	1143 (100.0)	40 (100.0)	17618 (100.0)	5658 (100.0)	1143 (100.0)	40 (100.0)	17618 (100.0)	5658 (100.0)	1143 (100.0)	40 (100.0)
2013 – 2014 Total no. of patients = 14136	Death	110 (1.3)	121 (2.8)	89 (6.8)	0 (0)	149 (1.8)	141 (3.2)	92 (7.0)	0 (0)	192 (2.3)	164 (3.8)	93 (7.1)	0 (0)	223 (2.6)	183 (4.2)	94 (7.2)	0 (0)
	Alive	8364 (98.7)	4230 (97.2)	1222 (93.2)	0 (0)	8325 (98.2)	4210 (96.8)	1219 (93.0)	0 (0)	8282 (97.7)	4187 (96.2)	1218 (92.9)	0 (0)	8251 (97.4)	4168 (95.8)	1217 (92.8)	0 (0)
	Total	8474 (100.0)	4351 (100.0)	1311 (100.0)	0 (0)	8474 (100.0)	4351 (100.0)	1311 (100.0)	0 (0)	8474 (100.0)	4351 (100.0)	1311 (100.0)	0 (0)	8474 (100.0)	4351 (100.0)	1311 (100.0)	0 (0)

*The outcome data was derived based on National Death Register data

Including patients who died in-hospital, * Including patients who died in-hospital and at 30 days, ****Including patients who died in-hospital, at 30 days, and at six months

Note: Patients with the status of "transferred to other centre", "lost to follow-up", "not available" and "missing" were categorised as "alive" patients

Table 5.8 Overall outcome of patients who underwent PCI, by PCI status, NCVD-PCI Registry, 2007 – 2014

Year	*Outcome	Outcome at discharge				**30-day				***6-month				****1-year			
		Elective	Non-elective	Not available	Missing	Elective	Non-elective	Not available	Missing	Elective	Non-elective	Not available	Missing	Elective	Non-elective	Not available	Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2013 Total no. of patients = 6353	Death	26 (0.6)	110 (6.6)	0 (0)	0 (0)	49 (1.0)	123 (7.4)	0 (0)	0 (0)	77 (1.6)	134 (8.0)	0 (0)	0 (0)	103 (2.2)	147 (8.8)	0 (0)	0 (0)
	Alive	4656 (99.4)	1561 (93.4)	0 (0)	0 (0)	4633 (99.0)	1548 (92.6)	0 (0)	0 (0)	4605 (98.4)	1537 (92.0)	0 (0)	0 (0)	4579 (97.8)	1524 (91.2)	0 (0)	0 (0)
	Total	4682 (100.0)	1671 (100.0)	0 (0)	0 (0)	4682 (100.0)	1671 (100.0)	0 (0)	0 (0)	4682 (100.0)	1671 (100.0)	0 (0)	0 (0)	4682 (100.0)	1671 (100.0)	0 (0)	0 (0)
2014 Total no. of patients = 7783	Death	25 (0.4)	159 (8.3)	0 (0)	0 (0)	38 (0.6)	172 (9.0)	0 (0)	0 (0)	55 (0.9)	183 (9.6)	0 (0)	0 (0)	61 (1.0)	189 (9.9)	0 (0)	0 (0)
	Alive	5847 (99.6)	1752 (91.7)	0 (0)	0 (0)	5834 (99.4)	1739 (91.0)	0 (0)	0 (0)	5817 (99.1)	1728 (90.4)	0 (0)	0 (0)	5811 (99.0)	1722 (90.1)	0 (0)	0 (0)
	Total	5872 (100.0)	1911 (100.0)	0 (0)	0 (0)	5872 (100.0)	1911 (100.0)	0 (0)	0 (0)	5872 (100.0)	1911 (100.0)	0 (0)	0 (0)	5872 (100.0)	1911 (100.0)	0 (0)	0 (0)

Year	*Outcome	Outcome at discharge				**30-day				***6-month				****1-year			
		Elective	Non-elective	Not available	Missing	Elective	Non-elective	Not available	Missing	Elective	Non-elective	Not available	Missing	Elective	Non-elective	Not available	Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2007 – 2012 Total no. of patients = 24459	Death	96 (0.5)	273 (8.8)	0 (0)	2 (14.3)	201 (0.9)	296 (9.5)	0 (0)	2 (14.3)	391 (1.8)	322 (10.3)	0 (0)	2 (14.3)	595 (2.8)	351 (11.3)	0 (0)	2 (14.3)
	Alive	21213 (99.5)	2839 (91.2)	24 (100)	12 (85.7)	21108 (99.1)	2816 (90.5)	24 (100)	12 (85.7)	20918 (98.2)	2790 (89.7)	24 (100)	12 (85.7)	20714 (97.2)	2761 (88.7)	24 (100)	12 (85.7)
	Total	21309 (100.0)	3112 (100.0)	24 (100.0)	14 (100.0)	21309 (100.0)	3112 (100.0)	24 (100.0)	14 (100.0)	21309 (100.0)	3112 (100.0)	24 (100.0)	14 (100.0)	21309 (100.0)	3112 (100.0)	24 (100.0)	14 (100.0)
2013 – 2014 Total no. of patients = 14136	Death	51 (0.5)	269 (7.5)	0 (0)	0 (0)	87 (0.8)	295 (8.2)	0 (0)	0 (0)	132 (1.3)	317 (8.8)	0 (0)	0 (0)	164 (1.6)	336 (9.4)	0 (0)	0 (0)
	Alive	10503 (99.5)	3313 (92.5)	0 (0)	0 (0)	10467 (99.2)	3287 (91.8)	0 (0)	0 (0)	10422 (98.7)	3265 (91.2)	0 (0)	0 (0)	10390 (98.4)	3246 (90.6)	0 (0)	0 (0)
	Total	10554 (100.0)	3582 (100.0)	0 (0)	0 (0)	10554 (100.0)	3582 (100.0)	0 (0)	0 (0)	10554 (100.0)	3582 (100.0)	0 (0)	0 (0)	10554 (100.0)	3582 (100.0)	0 (0)	0 (0)

*The outcome data was derived based on National Death Register data

Including patients who died in-hospital, *Including patients who died in-hospital and at 30 days, ****Including patients who died in-hospital, at 30 days, and at six months

Note: Patients with the status of "transferred to other centre", "lost to follow-up", "not available" and "missing" were categorised as "alive" patients

Table 5.9 Overall outcome of patients who underwent PCI, by acute coronary syndrome, NCVD-PCI Registry, 2007 – 2014

Year	*Outcome	Outcome at discharge				**30-day				***6-month				****1-year			
		STEMI	NSTEMI	UA	Not available/ Missing	STEMI	NSTEMI	UA	Not available/ Missing	STEMI	NSTEMI	UA	Not available/ Missing	STEMI	NSTEMI	UA	Not available/ Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2013 Total no. of patients = 6353	Death	87 (7.0)	18 (3.9)	6 (1.4)	1 (4.5)	98 (7.9)	21 (4.6)	12 (2.9)	1 (4.5)	106 (8.6)	23 (5.0)	16 (3.8)	1 (4.5)	120 (9.7)	23 (5.0)	17 (4.1)	1 (4.5)
	Alive	1150 (93.0)	439 (96.1)	412 (98.6)	21 (95.5)	1139 (92.1)	436 (95.4)	406 (97.1)	21 (95.5)	1131 (91.4)	434 (95.0)	402 (96.2)	21 (95.5)	1117 (90.3)	434 (95.0)	401 (95.9)	21 (95.5)
	Total	1237 (100.0)	457 (100.0)	418 (100.0)	22 (100.0)	1237 (100.0)	457 (100.0)	418 (100.0)	22 (100.0)	1237 (100.0)	457 (100.0)	418 (100.0)	22 (100.0)	1237 (100.0)	457 (100.0)	418 (100.0)	22 (100.0)
2014 Total no. of patients = 7783	Death	139 (8.9)	21 (3.1)	4 (0.9)	0 (0)	148 (9.5)	26 (3.8)	4 (0.9)	0 (0)	156 (10.0)	32 (4.7)	6 (1.4)	0 (0)	161 (10.3)	34 (5.0)	8 (1.8)	0 (0)
	Alive	1418 (91.1)	660 (96.9)	438 (99.1)	51 (100)	1409 (90.5)	655 (96.2)	438 (99.1)	51 (100)	1401 (90.0)	649 (95.3)	436 (98.6)	51 (100)	1396 (89.7)	647 (95.0)	434 (98.2)	51 (100.0)
	Total	1557 (100.0)	681 (100.0)	442 (100.0)	51 (100.0)	1557 (100.0)	681 (100.0)	442 (100.0)	51 (100.0)	1557 (100.0)	681 (100.0)	442 (100.0)	51 (100.0)	1557 (100.0)	681 (100.0)	442 (100.0)	51 (100.0)

Year	*Outcome	Outcome at discharge				**30-day				***6-month				****1-year			
		STEMI	NSTEMI	UA	Not available/ Missing	STEMI	NSTEMI	UA	Not available/ Missing	STEMI	NSTEMI	UA	Not available/ Missing	STEMI	NSTEMI	UA	Not available/ Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2007 – 2012 Total no. of patients = 9416	Death	243 (4.6)	49 (1.6)	12 (1.1)	6 (7.2)	277 (5.3)	70 (2.3)	16 (1.5)	6 (7.2)	321 (6.1)	110 (3.6)	26 (2.5)	6 (7.2)	373 (7.1)	148 (4.9)	37 (3.5)	6 (7.2)
	Alive	5004 (95.4)	2989 (98.4)	1036 (98.9)	77 (95.8)	4970 (94.7)	2968 (97.7)	1032 (98.5)	77 (95.8)	4926 (93.9)	2928 (96.4)	1022 (97.5)	77 (95.8)	4874 (92.9)	2890 (95.1)	1011 (96.5)	77 (95.8)
	Total	5247 (100.0)	3038 (100.0)	1048 (100.0)	83 (100.0)	5247 (100.0)	3038 (100.0)	1048 (100.0)	83 (100.0)	5247 (100.0)	3038 (100.0)	1048 (100.0)	83 (100.0)	5247 (100.0)	3038 (100.0)	1048 (100.0)	83 (100.0)
2013 – 2014 Total no. of patients = 14136	Death	226 (8.1)	39 (3.4)	10 (1.2)	1 (1.4)	246 (8.8)	47 (4.1)	16 (1.9)	1 (1.4)	262 (9.4)	55 (4.8)	22 (2.6)	1 (1.4)	281 (10.1)	57 (5.0)	25 (2.9)	1 (1.4)
	Alive	2568 (91.9)	1099 (96.6)	850 (98.8)	72 (98.6)	2548 (91.2)	1091 (95.9)	844 (98.1)	72 (98.6)	2532 (90.6)	1083 (95.2)	838 (97.4)	72 (98.6)	2513 (89.9)	1081 (95.0)	835 (97.1)	72 (98.6)
	Total	2794 (100.0)	1138 (100.0)	860 (100.0)	73 (100.0)	2794 (100.0)	1138 (100.0)	860 (100.0)	73 (100.0)	2794 (100.0)	1138 (100.0)	860 (100.0)	73 (100.0)	2794 (100.0)	1138 (100.0)	860 (100.0)	73 (100.0)

*The outcome data was derived based on National Death Register data

** Including patients who died in-hospital, *** Including patients who died in-hospital and at 30 days, ****Including patients who died in-hospital, at 30 days, and at six months

Note: Patients with status of "transferred to other centre", "lost to follow-up", "not available" and "missing" were categorised as "alive" patients

Table 5.10 Medication for patients who underwent PCI, NCVd-PCI Registry, 2007 – 2014

Year	#*Medication	Outcome at discharge		30-day		6-month		1-year	
		No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of alive patients = 24075	Aspirin	22241	92.4	12954	86.5	10149	81.5	8357	77.0
	Clopidogrel	22295	92.6	12263	81.9	8727	70.1	6232	57.5
	Ticlopidine	857	3.6	592	4.0	556	4.5	466	4.3
	**Dual antiplatelet	21556	89.5	11899	79.4	8324	66.9	5741	52.9
	Statin	21458	89.1	7010	46.8	10178	81.8	8604	79.3
	Beta blocker	16518	68.6	5093	34.0	7642	61.4	6453	59.5
	ACE inhibitor	12326	51.2	3743	25.0	5369	43.1	4395	40.5
	ARB	3012	12.5	1206	8.1	2101	16.9	1988	18.3
	Warfarin	266	1.1	63	0.4	89	0.7	67	0.6
	Prasugrel								
	Ticagrelor								
Others	16501	68.5	11379	76.0	8349	67.1	7271	67.0	
2013 Total no. of alive patients = 6217	Aspirin	5522	88.8	1866	81.9	1544	78.2	1114	68.6
	Clopidogrel	5162	83.0	1698	74.5	1310	66.3	750	46.2
	Ticlopidine	81	1.3	25	1.1	12	0.6	16	1.0
	**Dual antiplatelet	5049	81.2	1666	73.1	1281	64.9	711	43.8
	Statin	5325	85.7	1738	76.3	1500	75.9	1111	68.4
	Beta blocker	4158	66.9	1361	59.7	1198	60.7	895	55.1
	ACE inhibitor	3001	48.3	856	37.6	809	41.0	566	34.9
	ARB	607	9.8	197	8.6	171	8.7	167	10.3
	Warfarin	74	1.2	18	0.8	6	0.3	9	0.6
	Prasugrel	32	0.5	8	0.4	5	0.3	3	0.2
	Ticagrelor	354	5.7	42	1.8	25	1.3	23	1.4
Others	3430	55.2	1074	47.1	754	38.2	525	32.3	
2014 Total no. of alive patients = 7599	Aspirin	6890	90.7	1348	72	894	64.2	597	61.4
	Clopidogrel	6168	81.2	1288	68.8	782	56.1	417	42.9
	Ticlopidine	75	1.0	3	0.2	2	0.1	3	0.3
	**Dual antiplatelet	5946	78.2	1224	65.4	758	54.4	402	41.4
	Statin	6650	87.5	1291	69.0	858	61.6	594	61.1
	Beta blocker	5182	68.2	970	51.8	673	48.3	464	47.7
	ACE inhibitor	3633	47.8	679	36.3	471	33.8	345	35.5
	ARB	680	8.9	75	4.0	70	5.0	62	6.4
	Warfarin	72	0.9	20	1.1	12	0.9	7	0.7
	Prasugrel	73	1.0	7	0.4	3	0.2	0	0
	Ticagrelor	923	12.1	79	4.2	27	1.9	8	0.8
Others	4100	54.0	431	23.0	237	17.0	168	17.3	
2013 – 2014 Total no. of alive patients = 13816	Aspirin	12412	89.8	3214	77.4	2438	72.4	1711	65.9
	Clopidogrel	11330	82.0	2986	71.9	2092	62.1	1167	45.0
	Ticlopidine	156	1.1	28	0.7	14	0.4	19	0.7
	**Dual antiplatelet	10995	79.6	2890	69.6	2039	60.5	1113	42.9
	Statin	11975	86.7	3029	73.0	2358	70.0	1705	65.7
	Beta blocker	9340	67.6	2331	56.2	1871	55.6	1359	52.3
	ACE inhibitor	6634	48.0	1535	37.0	1280	38.0	911	35.1
	ARB	1287	9.3	272	6.6	241	7.2	229	8.8
	Warfarin	146	1.1	38	0.9	18	0.5	16	0.6
	Prasugrel	105	0.8	15	0.4	8	0.2	3	0.1
	Ticagrelor	1277	9.2	121	2.9	52	1.5	31	1.2
Others	7530	54.5	1505	36.3	991	29.4	693	26.7	

*Available for those who were alive

**Dual antiplatelet is combination of aspirin and clopidogrel or ticlopidine

#Patients were allowed to be in more than one type of category

Table 5.11 Cause of death of patients who underwent PCI, NCDV-PCI Registry, 2007 – 2014

Year	*Death cause	Outcome at discharge		**30-day		***6-month		****1-year	
		No.	%	No.	%	No.	%	No.	%
2007 – 2012 Total no. of patients = 371	Cardiac	290	78.2	330	66.1	378	52.9	423	44.6
	Renal	2	0.6	2	0.4	2	0.3	2	0.2
	Other	15	4.0	18	3.6	21	2.9	31	3.3
	Infection	9	2.4	9	1.8	9	1.3	9	0.9
	Neurological	3	0.8	3	0.6	3	0.4	3	0.3
	Vascular	1	0.2	1	0.2	1	0.1	1	0.1
	Pulmonary	2	0.6	2	0.4	2	0.3	2	0.2
	Non-cardiac	0	0	8	1.6	18	2.5	30	3.2
	Not available	12	3.2	24	4.8	83	11.6	140	14.8
	Missing	37	10.0	102	20.4	198	27.7	307	32.4
Total	371	100.0	499	100.0	715	100.0	948	100.0	
2013 Total no. of patients = 136	Cardiac	107	78.7	113	65.7	116	55.0	120	48.0
	Renal	0	0	0	0	0	0	0	0
	Other	8	5.9	9	5.2	11	5.2	11	4.4
	Infection	1	0.7	1	0.6	1	0.5	1	0.4
	Neurological	0	0	0	0	0	0	0	0
	Vascular	0	0	0	0	0	0	0	0
	Pulmonary	3	2.2	3	1.7	3	1.4	3	1.2
	Non-cardiac	0	0	0	0	2	0.9	6	2.4
	Not available	3	2.2	6	3.5	8	3.8	9	3.6
	Missing	14	10.3	40	23.3	70	33.2	100	40.0
Total	136	100.0	172	100.0	211	100.0	250	100.0	
2014 Total no. of patients = 184	Cardiac	140	76.1	145	69.0	152	63.9	153	61.2
	Renal	4	2.2	4	1.9	4	1.7	4	1.6
	Other	5	2.7	5	2.4	5	2.1	5	2.0
	Infection	3	1.6	3	1.4	3	1.3	3	1.2
	Neurological	0	0	0	0	0	0	0	0
	Vascular	0	0	0	0	0	0	0	0
	Pulmonary	1	0.5	1	0.5	1	0.4	1	0.4
	Non-cardiac	0	0	1	0.5	6	2.5	7	2.8
	Not available	2	1.1	3	1.4	6	2.5	8	3.2
	Missing	29	15.8	48	22.9	61	25.6	69	27.6
Total	184	100.0	210	100.0	238	100.0	250	100.0	
2013 – 2014 Total no. of patients = 320	Cardiac	247	77.1	258	67.5	268	59.6	273	54.6
	Renal	4	1.3	4	1.0	4	0.9	4	0.8
	Other	13	4.1	14	3.7	16	3.6	16	3.2
	Infection	4	1.3	4	1.0	4	0.9	4	0.8
	Neurological	0	0	0	0	0	0	0	0
	Vascular	0	0	0	0	0	0	0	0
	Pulmonary	4	1.3	4	1.0	4	0.9	4	0.8
	Non-cardiac	0	0	1	0.3	8	1.8	13	2.6
	Not available	5	1.6	9	2.4	14	3.1	17	3.4
	Missing	43	13.3	88	23.1	131	29.2	169	33.8
Total	320	100.0	382	100.0	449	100.0	500	100.0	

*The outcome data was derived based on National Death Register data

Including patients who died in-hospital, * Including patients who died in-hospital and at 30 days, ****Including patients who died in-hospital, at 30 days, and at six months

Table 5.12 Location of death of patients who underwent PCI, NCVD-PCI Registry, 2007 – 2014

Year	2007 – 2012 Total no. of patients = 371		2013 Total no. of procedures = 136		2014 Total no. of procedures = 184		2013 – 2014 Total no. of procedures = 320	
	No.	%	No.	%	No.	%	No.	%
In lab	34	9.2	16	11.8	17	9.2	33	10.3
Out of lab	287	77.4	98	72.1	134	72.9	232	72.5
Not available	10	2.7	2	1.5	3	1.6	5	1.6
Missing	40	10.7	20	14.6	30	16.3	50	15.6
Total	371	100.0	136	100.0	184	100.0	320	100.0

Table 5.13 Outcome at discharge of patients who developed cardiogenic shock peri-procedure, NCVD-PCI Registry, 2007 – 2014

Year	*Outcome	Cardiogenic shock peri-procedure					
		Yes		No		Missing	
		No.	%	No.	%	No.	%
2007 – 2012 Total no. of patients = 24459	Death	75	69.4	295	1.2	1	1.1
	Alive	33	30.6	23967	98.8	88	98.9
	Total	108	100.0	24262	100.0	89	100.0
2013 Total no. of patients = 6353	Death	33	80.5	103	1.6	0	0
	Alive	8	19.5	6161	98.4	48	100
	Total	41	100.0	6264	100.0	48	100.0
2014 Total no. of patients = 7783	Death	43	89.6	139	1.8	2	3.7
	Alive	5	10.4	7542	98.2	52	96.3
	Total	48	100.0	7681	100.0	54	100.0
2013 – 2014 Total no. of patients = 14136	Death	76	85.4	242	1.7	2	2.0
	Alive	13	14.6	13703	98.3	100	98.0
	Total	89	100.0	13945	100.0	102	100.0

*The outcome data was derived based on National Death Register data

Note: Patients with the status of "transferred to other centre", "lost to follow-up", "not available" and "missing" were categorised as "alive" patients

Table 5.14 Outcome at discharge, by post PCI TIMI flow, NCVd-PCI Registry, 2007 – 2014

Year	*Outcome	Post PCI TIMI flow					
		0	1	2	3	Not available	Missing
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2007 – 2012 Total no. of lesions = 34873	Death	25 (3.8)	16 (12.4)	37 (10.5)	341 (1.1)	8 (2.3)	31 (1.3)
	Alive	631 (96.2)	113 (87.6)	314 (89.5)	30709 (98.9)	346 (97.7)	2302 (98.7)
	Total	656 (100.0)	129 (100.0)	351 (100.0)	31050 (100.0)	354 (100.0)	2333 (100.0)
2013 Total no. of patients = 6353	Death	8 (5.2)	1 (2.2)	6 (4.0)	142 (1.9)	9 (4.5)	7 (1.7)
	Alive	146 (94.8)	44 (97.8)	143 (96.0)	7404 (98.1)	190 (95.5)	417 (98.3)
	Total	154 (100.0)	45 (100.0)	149 (100.0)	7546 (100.0)	199 (100.0)	424 (100.0)
2014 Total no. of patients = 7783	Death	9 (4.7)	7 (17.5)	22 (12.4)	155 (1.7)	8 (4.2)	21 (2.5)
	Alive	181 (95.3)	33 (82.5)	155 (87.6)	9206 (98.3)	181 (95.8)	834 (97.5)
	Total	190 (100.0)	40 (100.0)	177 (100.0)	9361 (100.0)	189 (100.0)	855 (100.0)
2013 – 2014 Total no. of patients = 14136	Death	17 (4.9)	8 (9.4)	28 (8.6)	297 (1.8)	17 (4.4)	28 (2.2)
	Alive	327 (95.1)	77 (90.6)	298 (91.4)	16610 (98.2)	371 (95.6)	1251 (97.8)
	Total	344 (100.0)	85 (100.0)	326 (100.0)	16907 (100.0)	388 (100.0)	1279 (100.0)

*The outcome data was derived based on National Death Register data

Note: Patients with status of "transferred to other centre", "lost to follow-up", "not available" and "missing" were categorised as "alive" patients

Table 5.15 Outcome at discharge, by contrast volume used, NCVD-PCI Registry, 2007 – 2014

Contrast volume, ml	2007 – 2012 Total no. of patients = 24459			2013 Total no. of patients = 6353			2014 Total no. of patients = 7783			2013 – 2014 Total no. of patients = 14136		
	*Death	Alive	Total	*Death	Alive	Total	*Death	Alive	Total	*Death	Alive	Total
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
≥ 300	38 (2.4)	1570 (97.6)	1608 (100.0)	12 (3.9)	295 (96.1)	307 (100.0)	7 (1.8)	381 (98.2)	388 (100.0)	19 (2.7)	676 (97.3)	695 (100.0)
< 300	286 (1.4)	19959 (98.6)	20245 (100.0)	98 (1.9)	5059 (98.1)	5157 (100.0)	133 (2.1)	6302 (97.9)	6435 (100.0)	231 (2.0)	11361 (98.0)	11592 (100.0)
Not available	32 (1.8)	1702 (98.2)	1734 (100.0)	12 (2.5)	466 (97.5)	478 (100.0)	25 (5.2)	455 (94.8)	480 (100.0)	37 (3.9)	921 (96.1)	958 (100.0)
Missing	15 (1.7)	857 (98.3)	872 (100.0)	14 (3.4)	397 (96.6)	411 (100.0)	19 (4.0)	461 (96.0)	480 (100.0)	33 (3.7)	858 (96.3)	891 (100.0)

**The outcome data was derived based on National Death Register data*

Note: Patients with the status of "transferred to other centre", "lost to follow-up", "not available" and "missing" were categorised as "alive" patients

Table 5.16 Summary of 30-day readmission status of patients who underwent PCI, NCVD-PCI Registry, 2007 – 2014 (N = total no. of procedures for 30-day follow- up)

	2007 – 2012		2013		2014		2013 – 2014	
	Total no. of procedures = 16329		Total no. of procedures = 2500		Total no. of procedures = 2070		Total no. of procedures = 4570	
Readmission	No.	%	No.	%	No.	%	No.	%
Yes	910	5.6	112	4.5	122	5.9	234	5.1
No	15370	94.1	2231	89.2	1772	85.6	4003	87.6
Missing	49	0.3	157	6.3	176	8.5	333	7.3
Readmission reason, No. (%)								
Non-cardiac			10	8.9	16	13.1	26	11.1
CHF	17	1.9	6	5.4	3	2.5	9	3.8
Recurrent angina	107	11.8	8	7.1	10	8.2	18	7.7
Arrhythmia	1	0.1	0	0	0	0	0	0
ACS			7	6.3	9	7.4	16	6.8
STEMI			2	33.3	4	57.1	6	46.2
NSTEMI			3	50	1	14.3	4	30.8
UA			1	16.7	2	28.6	3	23.1
Not available			0	.	2	.	2	.
Missing			1	.	0	.	1	.
Staged revascularisation			39	34.8	57	46.7	96	41.1
PCI			36	97.3	51	96.2	87	96.7
CABG			1	2.7	2	3.8	3	3.3
Not available			1	.	0	.	1	.
Missing			1	.	4	.	5	.
PCI-planned	505	55.5	16	14.4	0	0	16	6.8
PCI-unplanned	15	1.6	0	0	0	0	0	0
CABG	12	1.3	0	0	0	0	0	0
AMI	16	1.8	0	0	0	0	0	0
Others	181	19.8	8	7.1	0	0	8	3.4
Not available	18	2.0	9	8.0	14	11.4	23	9.9
Missing	38	4.2	9	8.0	13	10.7	22	9.4
Total	910	100.0	112	99.9	122	100.0	234	100.0

Table 5.17 Procedural complications and clinical outcomes, according to PCI status, NCVD-PCI Registry, 2007 – 2014

*Complications and clinical outcomes	2013 Total no. of patients = 6353										2014 Total no. of patients = 7783										
	Elective		NSTEMI/UA		AMI		Not available		Missing		Elective		NSTEMI/UA		AMI		Not available		Missing		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Procedural complications																					
Periprocedural MI/Significant periprocedural MI	15	0.3	4	0.7	14	1.3	0	0	0	0	23	0.4	11	1.7	28	2.2	0	0	0	0	
Emergency reintervention/PCI	22	0.5	5	0.9	15	1.4	0	0	0	0	19	0.3	12	1.9	34	2.7	0	0	0	0	
Stent thrombosis	4	0.1	0	0	1	0.1	0	0	0	0	4	0.1	1	0.2	4	0.3	0	0	0	0	
Dissection	0	0	0	0	1	0.1	0	0	0	0	1	0.0	0	0	0	0	0	0	0	0	
Cardiac perforation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Coronary perforation	1	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
New ischaemia	1	0.0	0	0	1	0.1	0	0	0	0	2	0.0	1	0.2	3	0.2	0	0	0	0	
Reinfarction	0	0	1	0.2	1	0.1	0	0	0	0	1	0.0	1	0.2	0	0	0	0	0	0	
Cardiac tamponade	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bail-out CABG	1	0.0	0	0	0	0	0	0	0	0	1	0.0	0	0	0	0	0	0	0	0	
Cardiogenic shock	9	0.2	2	0.3	30	2.7	0	0	0	0	4	0.1	3	0.5	41	3.2	0	0	0	0	
Arrhythmia	13	0.3	4	0.7	45	4.1	0	0	0	0	8	0.1	4	0.6	37	2.9	0	0	0	0	
TIA/stroke	3	0.1	0	0	2	0.2	0	0	0	0	0	0	0	0	2	0.2	0	0	0	0	
Tamponade	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.2	0	0	0	0	
Contrast reaction	6	0.1	1	0.2	0	0	0	0	0	0	3	0.1	0	0	0	0	0	0	0	0	
New onset/worsen heart failure	3	0.1	1	0.2	8	0.7	0	0	0	0	1	0.0	0	0	9	0.7	0	0	0	0	
New renal impairment	20	0.4	10	1.7	15	1.4	0	0	0	0	19	0.3	2	0.3	9	0.7	0	0	0	0	
Bleeding	7	0.1	4	0.7	5	0.5	0	0	0	0	5	0.1	1	0.2	4	0.3	0	0	0	0	
Access site occlusion	0	0	0	0	0	0	0	0	0	0	1	0.0	0	0	0	0	0	0	0	0	
Loss of distal/radial pulse	0	0	0	0	0	0	0	0	0	0	1	0.0	0	0	0	0	0	0	0	0	
Dissection	1	0.0	1	0.2	1	0.1	0	0	0	0	3	0.1	0	0	0	0	0	0	0	0	
Pseudoaneurysm	2	0.0	0	0	0	0	0	0	0	0	5	0.1	0	0	1	0.1	0	0	0	0	
Vascular perforation	1	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

**Results are only presented for patients who had the complications or clinical outcomes*

*Complications and clinical outcomes	2007 – 2012 Total no. of patients = 24459										2013 – 2014 Total no. of patients =14136										
	Elective		NSTEMI/UA		AMI		Not available		Missing		Elective		NSTEMI/UA		AMI		Not available		Missing		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Procedural complications																					
Periprocedural MI/Significant periprocedural MI	70	0.3	9	0.7	18	1.0	0	0	1	7.1	38	0.4	15	1.2	42	1.8	0	0	0	0	
Emergency reintervention/PCI	34	0.2	9	0.7	17	0.9	0	0	1	7.1	41	0.4	17	1.4	49	2.1	0	0	0	0	
Stent thrombosis	13	0.1	1	0.1	5	0.3	0	0	0	0	8	0.1	1	0.1	5	0.2	0	0	0	0	
Dissection	11	0.1	2	0.2	1	0.1	0	0	0	0	1	0.0	0	0	1	0.0	0	0	0	0	
Cardiac perforation											0	0	0	0	0	0	0	0	0	0	
Coronary perforation											1	0.0	0	0	0	0	0	0	0	0	
New ischaemia											3	0.0	1	0.1	4	0.2	0	0	0	0	
Reinfarction											1	0.0	2	0.2	1	0.0	0	0	0	0	
Cardiac tamponade											0	0	0	0	0	0	0	0	0	0	
Bail-out CABG	5	0.0	0	0	3	0.2	0	0	0	0	2	0.0	0	0	0	0	0	0	0	0	
Cardiogenic shock	37	0.2	15	1.2	56	3.1	0	0	0	0	13	0.1	5	0.4	71	3.0	0	0	0	0	
Arrhythmia	66	0.3	17	1.3	57	3.1	0	0	1	7.1	21	0.2	8	0.7	82	3.5	0	0	0	0	
TIA/stroke	6	0.0	2	0.2	2	0.1	0	0	0	0	3	0.0	0	0	4	0.2	0	0	0	0	
Tamponade	12	0.1	2	0.2	2	0.1	0	0	0	0	0	0	0	0	0.1	0	0	0	0		
Contrast reaction	11	0.1	0	0	4	0.2	0	0	0	0	9	0.1	1	0.1	0	0	0	0	0	0	
New onset/worsen heart failure	10	0.0	2	0.2	8	0.4	0	0	0	0	4	0	1	0.1	17	0.7	0	0	0	0	
New renal impairment	9	0.0	4	0.3	34	1.9	0	0	0	0	39	0.4	12	1.0	24	1.0	0	0	0	0	
Bleeding	84	0.4	19	1.5	24	1.3	0	0	1	7.1	12	0.1	5	0.4	9	0.4	0	0	0	0	
Access site occlusion	8	0.0	3	0.2	0	0	0	0	0	0	1	0.0	0	0	0	0	0	0	0	0	
Loss of distal/radial pulse	2	0.0	0	0	0	0	0	0	0	0	1	0.0	0	0	0	0	0	0	0	0	
Dissection	29	0.1	0	0	5	0.3	0	0	0	0	4	0.0	1	0.1	1	0.0	0	0	0	0	
Pseudoaneurysm	16	0.1	1	0.1	0	0	0	0	0	0	7	0.1	0	0	1	0.0	0	0	0	0	
Vascular perforation											1	0.0	0	0	0	0	0	0	0	0	

*Results were only presented for patients who had the complications or clinical outcomes

Table 5.18 Heart rate at presentation versus outcome, NCVD-PCI Registry, 2007 – 2014

Heart rate at presentation (beats/minute)	2007 – 2012 Total no. of patients = 24459				2013 Total no. of patients = 6353				2014 Total no. of patients = 7783				2013 – 2014 Total no. of patients = 14136			
	*Death		Alive		*Death		Alive		*Death		Alive		*Death		Alive	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
< 90	153	41.2	19467	80.8	49	36.1	4604	74.1	65	35.3	5724	75.3	114	35.6	10328	74.8
≥ 90	165	44.5	2457	10.2	63	46.3	780	12.5	86	46.8	1057	13.9	149	46.6	1837	13.3
Missing	53	14.3	2164	9.0	24	17.6	833	13.4	33	17.9	818	10.8	57	17.8	1651	11.9
Total	371	100.0	24088	100.0	136	100.0	6217	100.0	184	100.0	7599	100.0	320	100.0	13816	100.0

*The outcome data was derived based on National Death Register data

Note: Patients with the status of "transferred to other centre", "lost to follow-up", "not available" and "missing" were categorised as "alive" patients

Table 5.19 Heart rate at presentation versus length of stay, NCVD-PCI Registry, 2007 – 2014

Length of stay	2007 – 2012 Total no. of patients = 24088						2013 Total no. of patients = 6217						2014 Total no. of patients = 7599						2013 – 2014 Total no. of patients = 13816					
	v 90		^ 90		Missing		v 90		^ 90		Missing		v 90		^ 90		Missing		v 90		^ 90		Missing	
N	18985		2395		2101		4604		780		833		5721		1057		818		10325		1837		1651	
Mean (SD)	4.4 (16.1)		6.8 (28.4)		6.1 (29.5)		4.9 (15.8)		6.2 (20.4)		4.5 (13.5)		4.8 (14.0)		5.8 (13.0)		4.9 (14.0)		4.9 (14.8)		6.0 (16.6)		4.7 (13.7)	
Median, (min, max)	3.0 (1.0, 1098.0)		3.0 (1.0, 734.0)		3.0 (1.0, 736.0)		3.0 (1.0, 375.0)		4.0 (1.0, 513.0)		3.0 (1.0, 371.0)		3.0 (1.0, 369.0)		4.0 (1.0, 368.0)		3.0 (1.0, 367.0)		3.0 (1.0, 375.0)		4.0 (1.0, 513.0)		3.0 (1.0, 371.0)	
Negative/zero, No. (%)	268	1.4	30	1.2	12	0.6	0	0	0	0	0	0	3	0.1	0	0	0	0	3	0.0	0	0	0	0
Missing, No. (%)	214	1.1	32	1.3	51	2.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Alive included patients transferred to another centres

Table 5.20 Prognostic factors for in-hospital mortality among patients who underwent PCI, NCVD-PCI Registry, 2007 – 2014

Factor	2007 – 2012 Total no. of patients = 23843					2013 – 2014 Total no. of patients = 14133				
	N	Hazard ratio	95% CI		*p-value	N	Hazard ratio	95% CI		*p-value
Age [^]	23843	1.12	1.03	1.22	0.007					
Gender										
Male (ref)						11816	1.00			
Female						2317	1.66	0.79	3.48	0.177
PCI status										
Elective (ref)	20801	1.00				10551	1.00			
NSTEMI/UA	1227	2.13	0.88	5.18	0.096	1221	3.04	1.09	8.52	0.034
AMI/STEMI	1780	3.98	2.02	7.85	<0.001	2361	4.20	1.64	10.77	0.003
**Diabetes mellitus										
No (ref)										
Yes										
**Hypertension										
No (ref)	6383	1.00								
Yes	17443	0.59	0.35	0.99	0.047					
Killip class ^{\$}										
I (ref)	6234	1.00								
II	2936	2.36	1.13	4.93	0.022					
III	200	2.41	0.87	6.67	0.090					
IV	393	3.63	1.58	8.32	0.002					
Killip class										
I & II (ref)						5939	1.00			
III & IV						550	2.97	1.47	6.02	0.002

* using Cox regression with backward stepwise variable selection

**The "No" category for these variables included "Not known" category

[^]Variables were not included in the variables' selection method for 2013 – 2014 analysis

^{\$}Variables were recategorised for 2013 – 2014 analysis

Factor	2007 – 2012 Total no. of patients = 23843				2013 – 2014 Total no. of patients = 14133					
	N	Hazard ratio	95% CI		*p-value	N	Hazard ratio	95% CI		*p-value
Smoking status										
Never (ref)										
Former smokers										
Current smokers										
Left ventricular ejection fraction										
< 30	386	2.77	1.11	6.93	0.029	259	4.21	1.47	12.01	0.007
30 – 50	3549	1.37	0.61	3.09	0.448	2105	1.68	0.66	4.30	0.278
> 50 (ref)	4649	1.00				2675	1.00			
NYHA dyspnoea ≥ 3 or congestive heart failure^										
No (ref)	22265	1.00								
Yes	1557	2.01	1.18	3.43	0.010					
Cardiogenic shock^										
No (ref)	23683	1.00								
Yes	105	4.80	2.40	9.63	<0.001					
IABP^										
No (ref)	22902	1.00								
Yes	604	2.53	1.27	5.05	0.009					
Serum creatinine (> 200 μmol/L)										
No (ref)	20590	1.00				11447	1.00			
Yes	1116	1.88	1.06	3.34	0.03	616.00	3.42	1.64	7.11	0.001

*using Cox regression with backward stepwise variable selection

**The "No" category for these variables included the "Not known" category

^Variables were not included in the variables selection method for 2013 – 2014 analysis

\$Variables were recategorised for the 2013 – 2014 analysis

Table 5.21a Prognostic factors for 30-days mortality among patients who underwent PCI, NCVD-PCI Registry, 2007 – 2014 (Multivariate analysis)

Factor	2007 – 2012 Total no. of patients = 15169				2013 – 2014 Total no. of patients = 14133					
	N	Hazard ratio	95% CI		*p-value	N	Hazard ratio	95% CI		*p-value
Killip class ^s										
I & II (ref)						2120	1.00			
III & IV						114	5.98	2.69	13.27	< 0.001

^sVariables were recategorised for 2013 – 2014 analysis

Table 5.21b Prognostic factors for 30-days mortality among patients who underwent PCI, NCVD-PCI Registry, 2007 – 2014 (Forced model analysis)

Factor	2007 – 2009 Total no. of patients = 10516				2013 – 2014 Total no. of patients = 14133					
	N	Hazard ratio	95% CI		*p-value	N	Hazard ratio	95% CI		*p-value
Age group ^s										
20 – < 30 (ref)										
30 – < 40										
40 – < 50										
50 – < 60										
60 – < 70										
70 – < 80										
≥ 80										
Age group ^s										
20 – < 40 (ref)						235	1.00			
40 – < 60						2327	0.71	0.16	3.21	0.653
≥ 60						1651	1.52	0.34	6.79	0.584
Gender										
Male (ref)	12496	1.00								
Female	2673	2.36	1.35	4.12	0.003					

Factor	2007 – 2009 Total no. of patients = 10516				2013 – 2014 Total no. of patients = 14133					
	N	Hazard ratio	95% CI		*p-value	N	Hazard ratio	95% CI		*p-value
PCI status										
Elective (ref)	13672	1.00				3189	1.00			
NSTEMI/UA	675	1.61	0.57	4.54	0.370	307	2.33	0.84	6.47	0.103
AMI/STEMI	803	1.11	0.27	4.64	0.885	717	1.52	0.63	3.65	0.352
**Myocardial infarction history										
No (ref)						2638	1.00			
Yes						1575	0.44	0.18	1.05	0.066
Killip class ^s										
I (ref)										
II										
III										
IV										
Killip class ^s										
I & II (ref)						2120	1.00			
III & IV						114	4.22	1.69	10.55	0.002
Heart rate										
< 40										
40 – < 60										
60 – < 80 (ref)										
80 – < 100										
≥ 100										
Extent of coronary artery disease										
Single vessel disease (ref)						2832	1.00			
Multi vessels disease						1189	1.76	0.83	3.73	0.137
Left main/LMS^^						128	2.02	0.44	9.32	0.369
Graft^^						31	20.64	2.39	178.01	0.006

Factor	2007 – 2009 Total no. of patients = 10516				2013 – 2014 Total no. of patients = 14133					
	N	Hazard ratio	95% CI		*p-value	N	Hazard ratio	95% CI		*p-value
Left ventricular ejection fraction										
< 30	255	5.26	2.34	11.81	<0.001					
30 – 50	2535	1.50	0.85	2.64	0.157					
> 50 (ref)	3420	1.00								
Serum creatinine > 200 µmol/L										
No (ref)	13303	1.00								
Yes	678	3.19	1.65	6.18	0.001					
**Cerebrovascular disease										
No (ref)						4068	1.00			
Yes						145	1.14	0.25	5.10	0.865
Previous PCI										
No (ref)						3238	1.00			
Yes						975	0.85	0.29	2.50	0.771

*using Cox regression

**The "No" category for these variables included the "Not known" category

^Variables were not included in the variables selection method for the 2013 – 2014 analysis

^^Variables were not included in the 2007 – 2012 analysis

\$Variables were recategorised for 2013 – 2014 analysis

APPENDIX A: DATA MANAGEMENT

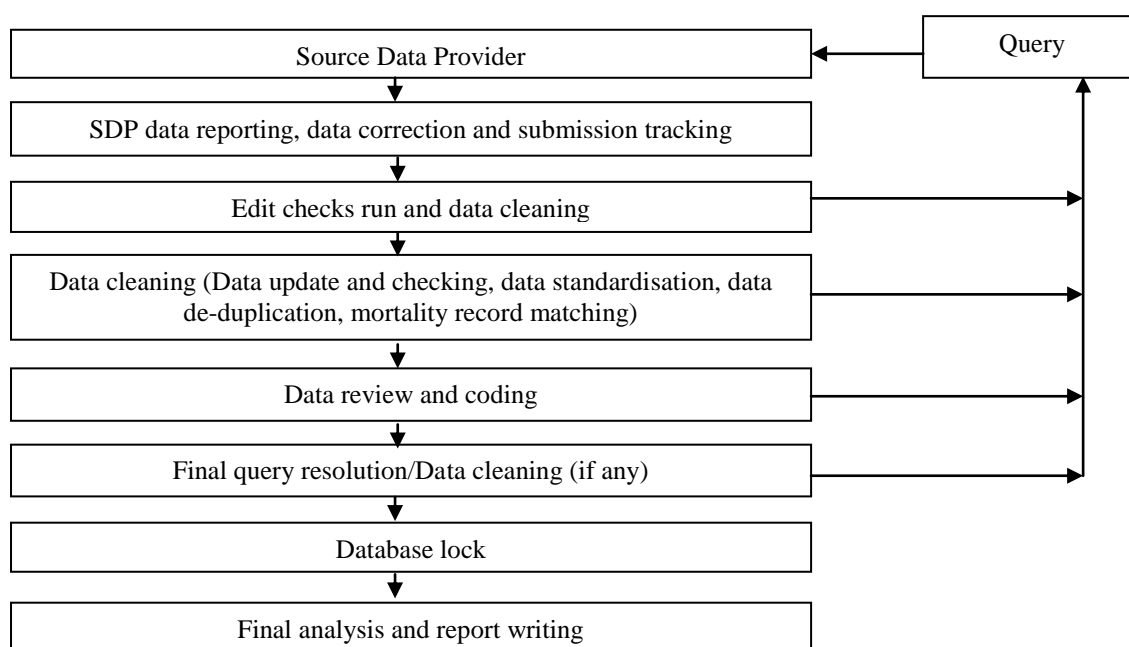
The National Cardiovascular Disease Database (NCVD) Registry maintains two different databases for cardiovascular diseases, i.e. for Acute Coronary Syndrome and Percutaneous Coronary Intervention. Data is stored in SQL Server due to the high volume of data accumulated throughout the years.

Data sources

Source Data Providers (SDPs) of NCVD-PCI registry comprise all major hospitals who participated in the registry, throughout Malaysia.

Data Flow Process

This section describes the data management flow process of the National Cardiovascular Disease Database.



SDP data reporting, data correction and submission tracking

Data reporting by SDP is done via web applications e-Case report forms.

There were a number of data security features that were designed into the NCVD web application (eCRF) such as web owner authentication, 2-level user authentication (user name and password authentication and a short messaging system (SMS) authorisation code for mobile phone authentication), access control, data encryption, session management to automatically log off the application, audit trail and data backup and disaster recovery plan.

For PCI, SDP submits NCVD-PCI notification form on an ad-hoc basis whenever a procedure is performed. SDP also submits follow-up data at 30-day, 6-month and 12-month post notification date intervals. An alert page containing all the overdue submissions for follow-up at 30-day, 6-month and 12-month post notification date is available to users to facilitate submissions tracking.

Prior to registering a patient record, a verification process is done by using the search functionality to search if the patient already exists in the entire registry. The application will still detect a duplicate record if the same MyKad number is keyed in, should this step be missed. This step is done to avoid duplicate records. For patients' whose records already exist in the database, SDP needs only to add a

new PCI notification with basic patient particulars pre-filled, based on existing patient information in the database. The PCI and ACS registries share the same patient list.

There were a few in-built functionalities at the data entry page that serve to improve data quality. One such function is auto calculation to reduce human error, in calculations. There is also an inconsistency check functionality that disables certain fields and prompts the user, if the value entered is out of range.

A real-time data query page is also available via the web application to enable users to check which non-compulsory data is missing, out of range, and inconsistent. A link is provided on the data query page for users to click to resolve the query for the particular patient.

Real time reports were also provided in the web application. The aggregated data reports are presented in tables and graphs. The aggregated data reports are typically presented in two manners, one as centre's own data aggregated data report and another as the registry's overall aggregated data report. In this way, the centre is able to compare itself against the overall registry's average.

Data download function is also available in the web application to allow users to download their own centre's data from all the forms entered, for their own further analyses. The data are downloadable in Text-tab delimited (.txt) format, Microsoft excel workbook (.xls) and as Comma separated value (.csv) format.

Edit checks run and data cleaning

Edit checks is performed periodically by the registry manager to identify missing compulsory data, out-of-range values, inconsistency of data, invalid values, and errors with de-duplication. Data cleaning is then performed based on the results of edit checks. Data update and data checking of the dataset were performed when there is a query of certain fields as and when necessary. It could be due to request by user, correction of data based on checking via data query in eCRF or after receiving results for preliminary data analysis. During data standardisation, missing data were handled based on derivation from existing data. Data de-duplication is also performed to identify duplicate records in the database that might have been missed out by SDPs. Finally, matching the record against the National Death Register (*Jabatan Pendaftaran Negara*) database is performed to verify the mortality status of the patient.

Final query resolution/data cleaning/database lock

A final edit check run is performed to ensure that the data is clean. All queries will be resolved before the database is locked, to ensure data quality and integrity. The final dataset is subsequently locked and exported to the statistician for analysis.

Data analysis

Please refer to the Statistical Analysis Method section for further details.

Data release policy

One of the primary objectives of the Registry is to make data available to the cardiovascular healthcare providers, policy makers and researchers. The Registry would appreciate that users acknowledge the Registry for the use of the data. Any request for data that requires a computer run must be made in writing (by e-mail, fax, or registered mail) accompanied with a Data Release Application Form and signed Data Release Agreement Form. These requests need prior approval by the Advisory Board before data can be released.

Registry ICT infrastructure and data centre

The operation of the NCVD is supported by an extensive ICT infrastructure to ensure operational efficiency and effectiveness.

NCVD subscribes to co-location service with a high availability and highly secured Internet Data Centre at Cyberjaya in order to provide NCVD with quality assured internet hosting services and state-of-the-art physical and logical security features without having to invest in costly data centre setup internally. Physical security features implemented includes state-of-the-art security features such as anti-static raised flooring, fire protection with smoke and heat alarm warning system, biometric security access, video camera surveillance system, uninterrupted power supply, environmental control, etc.

Other managed security services include patch management of the servers, antivirus signature monitoring and update, firewall traffic monitoring and intrusion detection, security incidence response, data backup service done on a daily, weekly and monthly basis, data recovery simulation to verify that the backup works, which is done at least once yearly, network security scan and penetration test done on a half-yearly basis, security policy maintenance, maintenance and monitoring of audit trail of user access, etc. Managed system services such as usage and performance report, operating system maintenance and monitoring, bandwidth monitoring and systems health monitoring were also provided.

APPENDIX B: STATISTICAL METHODS

The analysis described below was conducted on data collected in the NCVD-PCI registry for 2013 and 2014. Inclusion criteria were all patients who had PCI procedures performed in 2013 or 2014 and were aged 20 years and above. In general, the unit of analysis was PCI procedures performed or treated lesions. However, for some results, a patient level analysis was conducted.

Regarding the CRFs used for data collection: Data on some of the patients with PCI procedure in 2013 was collected using an earlier version of the CRF (version 1.4). Whereas other patient data was collected using the new CRF (version 1.5). In the new CRF, certain variables such as IABP, PCI status for STEMI, functional ischaemia, were collected in a different format and categorisation. Therefore, in the data preparation process, we combined the information for these variables in order that the data could be analysed appropriately.

Statistical methods used mainly descriptive analysis. For discrete data, we calculated frequency and percentages; while for continuous data, the mean, standard deviation (SD), median, minimum and maximum values were calculated. The only exception to this was regression analysis performed to evaluate prognostic factors for in-hospital mortality and 30-day mortality.

Missing data was reported for both discrete and continuous data. No statistical imputation was applied to replace any missing data. Acceptable ranges for different characteristics are presented in the table below:-

Name of the field	Acceptable range
Age	≥ 20 years old
Height	130 – 250 cm
Weight	40 – 200 kg
Body mass index (BMI)	14 – 50 kgm ⁻²
Heart rate	25 – 200 beats/min
Systolic blood pressure	60 – 230 mmHg
Diastolic blood pressure	10 – 120 mmHg
Creatinine	44 – 2000 micromol/L
Total cholesterol (TC)	2.0 – 5.0 mmol/L
Low-density lipoprotein (LDL)	0.7 – 20.0 mmol/L
Ejection fraction status	10 – 80 %
Fluoroscopy time	2.0 – 180.0 minutes
Contrast volume	15.0 – 500.0 mL
Pre-stenosis	0 – 100 %
Post-stenosis	0 – 100 %
Estimated lesion length	1.0 – 150.0 mm
Stent length	8.0 – 80.0 mm
Stent diameter	2.0 – 7.0 mm
Maximum balloon size used	1.0 – 6.0 mm
Maximum stent/balloon deploy pressure	1.0 – 40.0 mm
HbA1c	4.0 – 32.0 %

Analysis performed for each report chapter is described below:

1. Chapter 1: Patient characteristics

Patient characteristics were summarised in Chapter 1. Numbers of patients in each year were determined based on their PCI procedure year. The results presented the patients' age, gender, ethnicity, coronary risk factors, comorbidities, lab investigations, previous interventions, and other variables contained in the CRF.

2. Chapter 2: Clinical presentations and investigations

Chapter 2 included an analysis of clinical presentation, baseline investigations, cardiac status such as NYHA and Killip class, Canadian Cardiovascular Score and IABP use at PCI procedure. An analysis of STEMI time-to-treatment was performed in which we excluded any illogical values for time-to-treatment (such as negative values for symptom-to-door and door-to-balloon time).

3. Chapter 3: Procedural setting

Chapter 3 included an analysis of the procedural details and treatment received by the patients. This chapter includes results for PCI procedure characteristics, duration of thienopyridine use, PCI and access site.

4. Chapter 4: Lesion characteristics

Lesion characteristics were summarised in Chapter 4. This chapter included location of lesion, types of lesion, types of stent, types of intracoronary devices used, stent diameter, stent length and TIMI flow. Sub-group analyses were performed for PCI to left main stem, in-stent restenosis and graft lesion and CTO. In this chapter, numbers of lesions in each year were used as the denominator in the results. This was unlike other chapters where numbers of patients was the denominator.

5. Chapter 5: Outcome

The overall in-hospital mortality, all-cause mortality, post-procedural complications, medications and patient outcome at discharge and follow-up (30-days, six months, and one year) are presented in Chapter 5. In order to evaluate the status of patients (whether alive or deceased), individual patients were matched against the status provided by the Malaysian National Registration Department (NRD). Patients were considered as alive at the time of follow-up if the death date was not provided in the NRD dataset.

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APPENDIX E: GLOSSARY

Access site occlusion	Indicates whether an access site occlusion occurred at the site of percutaneous entry during the procedure or after the laboratory visit, but before any subsequent laboratory visits. This is defined as total obstruction of the artery usually by thrombus (but may have other causes) usually at the site of access, requiring surgical repair. Occlusions may be accompanied by absence of palpable pulse or Doppler.
Acute Coronary Syndrome (ACS)	Indicates if the patient is suffering from an ACS event. ACS encompasses clinical features comprising chest pain or overwhelming shortness of breath, defined by accompanying clinical, ECG, and biochemical features. ACS comprises the following: <ul style="list-style-type: none">- Unstable Angina Pectoris (UAP)- NSTEMI- STEMI
Bail-out CABG	Urgent/emergent CABG as a complication related to the index PCI (e.g. secondary to stent thrombosis, left main or TVR dissection, coronary perforation, unsuccessful INDEX PCI). This also applies to where the CABG was precipitated due to worsening, sudden chest pain, CHF, AMI, or anatomy.
Bleeding	The person's episode of bleeding as described by the thrombolysis in myocardial infarction (TIMI) criteria. Indicate if bleeding occurred during or after the cath. lab visit until discharge. The bleeding should require a transfusion and/or prolong the hospital stay and/or cause a drop in haemoglobin > 3.0 gm/dl.
Body Mass Index (BMI)	A measurement of the relative percentages of fat and muscle mass in the human body, in which weight in kilograms is divided by height in metres and the result used as an index of obesity (kgm^{-2}). This will be autocalculated by the system.
Canadian Cardiovascular Score (CCS)	Indicates the Canadian Cardiovascular Angina Classification Score (CCS) of a patient which is categorised as: <ul style="list-style-type: none">Class 0: AsymptomaticClass 1: Ordinary physical activity, such as walking or climbing the stairs does not cause angina. Angina may occur with strenuous, rapid or prolonged exertion at work or recreation.Class 2: There is a slight limitation to ordinary activity. Angina may occur with moderate activity such as walking or climbing stairs rapidly, walking uphill, walking or climbing stairs after meals, in the cold, in the wind, or under emotional stress, or walking more than two blocks on the level, and climbing more than one flight of stairs at normal pace under normal conditions.Class 3: There is marked limitation to ordinary physical activity. Angina may occur after walking one or two blocks on the level or climbing one flight of stairs under normal conditions at a normal pace.Class 4: There is inability to carry on any physical activity without discomfort; angina may be present at rest.

Cardiogenic shock	Indicates if the patient fulfilled the clinical criteria for cardiogenic shock as follows: <ul style="list-style-type: none"> a. hypotension (a systolic BP of < 90 mmHg for at least 30 minutes or the need for supportive measures to maintain a systolic BP of > 90 mmHg). b. end-organ hypoperfusion (cool extremities or a urine output of less than 30 ml/h, and a heart rate > 60 beats per minute). c. the haemodynamic criteria are a cardiac index of no more than 2.2 l/min per square meter of body-surface area and a pulmonary-capillary wedge pressure of at least 15 mmHg.
Chronic renal failure	Indicates if the patient has a history and/or documented evidence and/or have undergone treatment for chronic renal failure. Includes all patients with creatinine 200 micromol/L.
Contralateral Injections	Injection of contrast injected in the opposite non-occluded vessel.
Current smoker	Patient who regularly smokes a tobacco product/products one or more times per day or has smoked within the 30 days prior to this admission.
Diabetes	Indicates if the patient has diabetes as documented by the following: <ol style="list-style-type: none"> 1. A history of diabetes, regardless of duration of disease, or need for antidiabetic agents, or 2. Fasting blood glucose > 7.0 mmol/L, or 3. HbA1c > 6.5 mmol/L
Direct stenting	Stent deployment without prior treatment of stenotic segment.
Dissection (post procedure)	Indicates for the treated segment (or for a significant side branch) if a dissection > 5 mm was observed during the PCI procedure. Dissection is defined as the appearance of contrast materials outside of the expected luminal dimensions of the target vessel and extending longitudinally beyond the length of the lesion.
Dissection (vascular)	Indicates whether a dissection occurred at the site of percutaneous entry during the procedure or after lab visit but before any subsequent lab visits. A dissection is defined as a disruption of an arterial wall resulting in splitting and separation of the intimal (subintimal) layers.
Documented CAD	Indicates if the patient has angiographically-proven coronary disease (stenosis > 50%) or has undergone percutaneous angioplasty (PCI) or coronary artery bypass graft (CABG) prior to this admission to the hospital.
Door to balloon time	The duration between time patient presented to the reporting centre to time of first intracoronary device used performed by the same centre. Applicable only to patients with STEMI undergoing urgent PCI.
Door to needle time	The duration between time patients presented to the reporting centre to time intravenous fibrinolytic therapy was administered or initiated by that same centre. Applicable only to STEMI patients receiving thrombolysis at the reporting centre.
Elective PCI	PCI performed for patients with stable CAD.
Emergency Reintervention/PCI	Indicates if the patient required an UNPLANNED PCI during hospitalisation and prior to discharge that occurs as a complication related to the index PCI e.g., – stent thrombosis, dissection with target vessel occlusion).
French size	The French size of the guiding catheter or guiding sheath used to cannulate the ostium of the coronary artery. The largest size used should be indicated.

Functional ischaemia	Indicates if the patient has functional ischaemia as indicated by a non-invasive test such as exercise or pharmacological stress test, radionuclide, echo, CT scan done to rule out ischaemia. The test could be performed at admission (prior to the PCI), or it could be a test that resulted in the admission.
Glomerular Filtration Rate (MDRD)	Glomerular filtration rate (GFR) is the volume of fluid filtered from the renal (kidney) glomerular capillaries into the Bowman's capsule per unit time calculated using the Modification of Diet in Renal Disease (MDRD) formula. $GFR_{MDRD} = 186 \times (\text{serum creatinine } (\mu\text{mol/L}) / 88.4)^{-1.154} \times \text{AGE}^{-0.203} \times (0.742 \text{ if female})$. The unit is mL/min/1.73m ² .
Intra Aortic Balloon Pump (IABP)	Indicates if an Intra Aortic Balloon Pump has been used during the procedure.
Killip classification	Identifies the Killip class, as a measure of haemodynamics compromise, of the person at the time of presentation Class I includes individuals with no clinical signs of heart failure Class II includes individuals with rales in the lungs, an S3 gallop, and elevated jugular venous pressure Class III describes individuals with frank pulmonary oedema Class IV describes individuals in cardiogenic shock
Lesion code	Indicates the sites of lesion treated by PCI.
Lesion result	Indicates for the treated lesion whether the treatment was successful or unsuccessful.
Lesion type	The lesion type according to ACC/AHA guidelines that determines the complexity of the lesions thus determining the success rate and complication rates following PCI.
Loss of radial pulse	Indicates whether an acute loss of the pulse radial to the arterial access site occurred either by dissection, thrombus, or distal embolisation.
LVEF	The left ventricular ejection fraction as measured by the percentage of the blood emptied from the left ventricle at the end of the contraction. Indicates the EF status at the time of PCI procedure. The most recent test within the last six months, including the current procedure and up to discharge following the procedure.
Medina Classification	It involves assigning a binary value (1, 0) to each of the three components of a bifurcation (proximal region of main branch, distal region of main branch, and the side branch) depending whether there is more than (1) or less than (0) fifty percent lesion stenosis. If only proximal segment of the main branch has a significant lesion, it becomes Medina 1, 0, 0. If distal segment of main branch alone is involved, it becomes 0, 1, 0. Sole involvement of side branch is designated 0, 0, 1 and involvement of all the three is designated 1, 1, 1 and so on.
No Reflow	Indicates for the treated segment if there was a period where no flow was noted during the PCI procedure.

New York Heart Association	<p>Indicates the patient's NYHA classification as follows:</p> <ul style="list-style-type: none"> I. Patient has cardiac disease but without resulting limitations to ordinary physical activity; ordinary physical activity (e.g. walking several blocks or climbing stairs) does not cause undue fatigue or dyspnoea. Limiting symptoms may occur with marked exertion. II. Patient has cardiac disease resulting in slight limitation to ordinary physical activity. Patient is comfortable at rest. Ordinary physical activity such as walking more than two blocks or climbing more than one flight of stairs results in limiting symptoms (e.g., fatigue or dyspnoea). III. Patient has cardiac disease resulting in marked limitation of physical activity. Patient is comfortable at rest. Less than ordinary physical activity (e.g., walking one to two level blocks or climbing one flight of stairs) causes fatigue or dyspnoea. IV. Patient has dyspnoea at rest that increases with any physical activity. Patient has cardiac disease resulting in inability to perform any physical activity without discomfort. Symptoms may be present even at rest. If any physical activity is undertaken, discomfort is increased.
Percutaneous entry	Indicates the percutaneous entry location used to provide vascular access for the procedure.
Perforation	Indicates for the treated segment if a perforation occurred during the procedure.
Pre-stenosis	Indicates the % of most severe pre-procedure stenosis assessed. This does not include collateral circulation.
Pseudoaneurysm	Indicates whether a pseudoaneurysm occurred at the site of percutaneous entry during the procedure or after the laboratory visit but before any subsequent laboratory visits. This does not account for pseudoaneurysms noted after discharge. Pseudoaneurysm is defined as the occurrence of a disruption and dilation of the arterial wall without identification of the arterial wall layers at the site of the catheter entry, as demonstrated by arteriography or ultrasound.
Smoking status	Indicates if the patient has a history confirming any form of tobacco use in the past. This includes the use of cigarettes/cigars/pipes/tobacco chewing.
Status - Elective	PCI performed in patient with stable CAD either planned/staged PCI following coronary angiogram done earlier or PCI performed during the time of angiogram (ad-hoc).
Status - NSTEMI/UA	PCI for patients admitted with NSTEMI/UA.
Status - STEMI	PCI for patient admitted with STEMI following different treatment strategies.
TIA / Stroke	Indicates if the patient experienced a cerebrovascular accident (CVA) noted during the cath lab visit or after lab visit until discharge (or before any subsequent lab visits), as documented by CT/MRI confirmation.
Time of first balloon inflation / stent / aspiration	Indicates the time of the intracoronary treatment device deployment.
TIMI Flow (Post)	Indicates the post-procedure TIMI flow down the treated vessel.
TIMI Flow (Pre)	Indicates the pre-procedure TIMI flow down the treated vessel.
Vascular perforation	Perforation of the peripheral vessel where the catheter/sheath/wire is being tracked.

APPENDIX F: CASE REPORT FORM